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Case Report

Partial Anomalous Left Pulmonary Artery Sling in an Adult

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ABSTRACT

We report a case of a partial anomalous left pulmonary artery sling in an adult patient as an incidental finding on computed tomography. There is a normal bifurcation of the pulmonary trunk into right and left pulmonary arteries with anomalous origin of the left upper lobe pulmonary artery from the right pulmonary artery. The anomalous vessel passes between the trachea and esophagus forming a partial left pulmonary artery sling without airway compression.

Keywords: Pulmonary artery sling, Anomalous pulmonary artery, Vascular sling

INTRODUCTION

Pulmonary artery sling is a rare congenital vascular anomaly, in which the left pulmonary artery arises from the right pulmonary artery and courses between the trachea and esophagus to supply the left lung. Patients typically present within the first few weeks of life with stridor, wheezing, respiratory distress, or pneumonia, or they may present later with feeding difficulties.[1,2] About 90% of cases are diagnosed within the 1st year of life. The condition is rarely asymptomatic and often found in conjunction with other congenital anomalies.[3] Even rarer than the pulmonary sling is a partial anomalous left pulmonary artery, sometimes called a duplicated or accessory left pulmonary artery, in which the pulmonary trunk bifurcates into the normal right and left pulmonary arteries and a second left pulmonary artery arises from the right pulmonary artery to supply a portion of the left lung. Various anatomical orientations of the partial anomalous left pulmonary artery have been described, with the designation "partial left pulmonary artery sling" reserved for those cases, in which the anomalous vessel courses between the trachea and esophagus in the typical location of a pulmonary sling. In all of the few prior reports, this abnormality has only been described in infants or young children with other congenital anomalies, especially congenital heart disease.[4-7] To the best of our knowledge, the case we report is the first instance of this anomaly presenting as an incidental finding in an adult patient.

CASE REPORT

A 72-year-old man with no significant medical history presented to our emergency department after a syncopal episode at an airport following a long flight. He was otherwise in good health and not taking any medications. In the emergency department, he was hypertensive, tachycardic,

tachypneic, and hypoxic to 84% oxygen saturation on room air. Pulmonary embolism was suspected. Computed tomography (CT) angiography of the chest confirmed bilateral segmental pulmonary embolism. Subsequent ultrasound examination of the lower extremities revealed deep venous thrombosis on the left side. As an incidental finding, the CT angiogram showed that the patient had two left pulmonary arteries, one arising at the usual bifurcation of the pulmonary trunk to supply the left lower lobe and the other arising from the proximal right pulmonary artery. The accessory left pulmonary artery formed a pulmonary artery sling coursing between the trachea and the esophagus to supply the left upper lobe [Figure 1]. There was no compression of the trachea and there were no additional vascular or tracheobronchial malformations. On questioning, the patient denied the presence of any respiratory or feeding difficulties that could be attributed to the abnormality. After the management of his pulmonary emboli, the patient was discharged and given instructions for follow-up with his health-care provider.

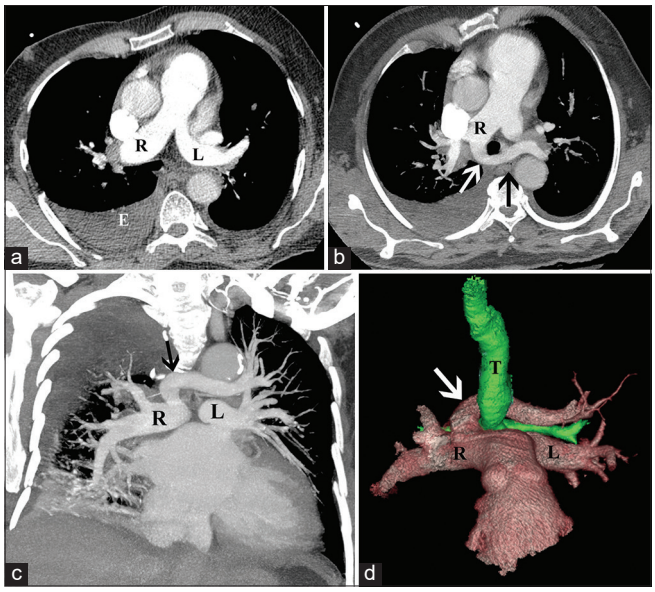

Figure 1: A 72-year-old man with partial anomalous left pulmonary artery sling. (a) Axial image from contrast-enhanced computed tomography scan shows bifurcation of the main pulmonary artery into the right pulmonary artery (R) and left pulmonary artery (L). There is an incidental right pleural effusion (E). (b) Axial maximum intensity projection (MIP) view shows an anomalous pulmonary artery (white arrow) arising from the right pulmonary artery (R). The anomalous vessel passes posterior to the trachea and anterior to the esophagus (black arrow). (c) Coronal MIP image shows anomalous left pulmonary artery (black arrow) arising from the right pulmonary artery (R) to supply the left upper lobe. L = left pulmonary artery. (d) Volume rendered view from anterior perspective depicts the anatomic relationship of the pulmonary arteries (pink) to the airways (green). The anomalous pulmonary artery (arrow) arises from the right pulmonary artery (R) and passes posterior to the trachea (T).

DISCUSSION

Partial anomalous left pulmonary artery is a rare condition defined as the coexistence of a normal left pulmonary artery and an anomalous pulmonary artery arising from the right pulmonary artery which also provides blood flow to the left lung. In most cases, the anomalous pulmonary vessel supplies the left lower lobe. Two variants of this abnormality have been described. In the first form, simply called "partial anomalous left pulmonary artery" or "pseudo-pulmonary sling," the anomalous artery arises from the proximal right pulmonary artery and courses anterior or inferior to the trachea to the left lung, usually without airway compression. In the second form, referred to as "partial left pulmonary artery sling," the anomalous vessel passes posterior to the trachea and anterior to the esophagus forming a pulmonary sling. This variant is associated with compression of the distal trachea.[5,7]

The embryologic origin of the pulmonary artery sling is uncertain, but is generally believed to occur from malformation of the left sixth aortic arch. The bilateral sixth aortic arches supply blood to the developing lung buds and ultimately differentiate into the right and left pulmonary arteries. It has been proposed that if the left pulmonary artery fails to form normally, the developing right pulmonary artery can supply a collateral branch to the left lung bud. The collateral may course anterior to the trachea without airway compression or pass posterior to the trachea forming a pulmonary sling, typically with airway compression. Similarly, a partial anomalous left pulmonary artery may result when the left pulmonary artery forms in its usual location, but an additional communication arises between the right pulmonary artery and the left lung bud. This anomalous vessel may course anterior (or inferior) to the trachea resulting in a partial anomalous pulmonary artery or pass posterior to the trachea forming a partial left pulmonary artery sling.[4,5,8,9]

To the best of our knowledge, partial left pulmonary artery sling has been described in only four prior reports. In those reports, the subjects were either infants (3 cases) or young children (1 case). In all cases, there were additional congenital anomalies such as hypoplastic right lung with tracheal stenosis, multiple ventricular septal defects, partial atrioventricular septal defect, and atrial septal defect with abnormal "Christmas tree" morphology of tracheal branching.[4-7] Our case, however, is the first description of this anomaly in an adult patient and in a patient without other congenital abnormalities. In addition, we describe the first case in which the anomalous vessel supplies the left upper lobe as opposed to the left lower lobe. The absence of tracheal compression in our case is also unusual, although this was present in one prior report.[5] While airway obstruction is typically associated with the classic pulmonary artery sling

in children, asymptomatic forms can be encountered in adult patients.[10] Factors mitigating obstruction in these rare cases have not been elucidated.

CONCLUSION

We have described the CT appearance of a partial anomalous left pulmonary artery sling encountered in an adult patient without evidence of any associated congenital anomalies or airway compression. Although rare, the anomaly is well characterized on CT.

Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

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