Clinical History:

Pleuritic chest pain and shortness of breath. A CT pulmonary angiogram (CTPA) was performed.

Imaging Findings:

A 53 year old male presented with left sided pleuritic chest pain and shortness of breath. He gave a past history of deep venous thrombosis and was not presently on anticoagulants. A CT pulmonary angiogram (CTPA) was performed for investigation of a suspected pulmonary embolus. An anomalous vessel (vertical vein) was identified lateral to the aortic arch in the left para-aortic space (Fig 1). Multiplanar reconstructions clearly demonstrated this vessel to arise from the left pulmonary vein and drain into the left brachiocephalic vein (Fig 2). The findings were consistent with an incidental partial anomalous pulmonary venous drainage. No evidence of a pulmonary embolus was identified.

Discussion:

Partial anomalous pulmonary venous drainage (PAPVD) is a congenital anomaly in which a pulmonary vein drains into the right atrium or one of its tributaries, instead of the left atrium. This therefore creates a left to right shunt. Patients are usually acyanotic. In the paediatric population the incidence of PAPVD is approximately 0.4-0.7%, is twice as common in males and the anomalous vein is right sided in 90% of cases. 80-90% of patients have an associated atrial septal defect (ASD). The size of the shunt is usually larger in children, when compared to adults and surgical correction is indicated if the ratio of pulmonary-to-systemic blood flow exceeds 1.5:1. A recent series described PAPVD diagnosed with CT in adults and reported an incidence of 0.2%. The anomalous vein was left sided in approximately 80% and the majority of patients were female (66%). In adults PAPVD is infrequently associated with an ASD. The difference in the distribution of PAPVD in this study may be attributable to the fact that left sided anomalies are easier to detect with CT than right sided ones. The anomalous vein in adults most commonly arises form the left upper lobe and connects to the left brachiocephalic vein via a persistent left vertical vein. Less frequently a right upper lobe vein can drain into the SVC or a right lower lobe vein can drain into the supra-hepatic portion of the IVC. Differentiation of a left upper lobe PAPVD and a left sided SVC can be difficult. With a left upper lobe PAPVD the pulmonary veins drain into a left sided anomalous mediastinal vein called a vertical vein. This vein drains into the left brachiocephalic vein which subsequently drains into the SVC. A left sided SVC arises at the junction of the left internal jugular vein and subclavian vein. It descends down the left mediastinum in the left para-aortic space and then drains into the coronary sinus, which is usually enlarged. It can therefore appear similar to a vertical vein of PAPVD. A right sided SVC may or may not be also present.

Differential Diagnosis List: Partial Anomalous Pulmonary Venous Drainage.
Final Diagnosis: Partial Anomalous Pulmonary Venous Drainage.

References:
Dillon EH et al. Partial anomalous pulmonary venous drainage of the left upper lobe vs duplication of the superior vena cava: Distinction based on CT findings. AJR 1993;160(2):375-379. (PMID: 8424355)
Description: Fig 1: A left para-aortic vertical vein (arrow) is demonstrated on this axial CTPA image.
Origin:
Figure 2

Description: Fig 2: Volume rendered coronal multiplanar reconstruction clearly demonstrating the left pulmonary vein draining into the left brachiocephalic vein via a vertical vein (arrow). Origin: