

# Right-to-left shunt secondary to duplicated superior vena cava as etiology of ischemic stroke

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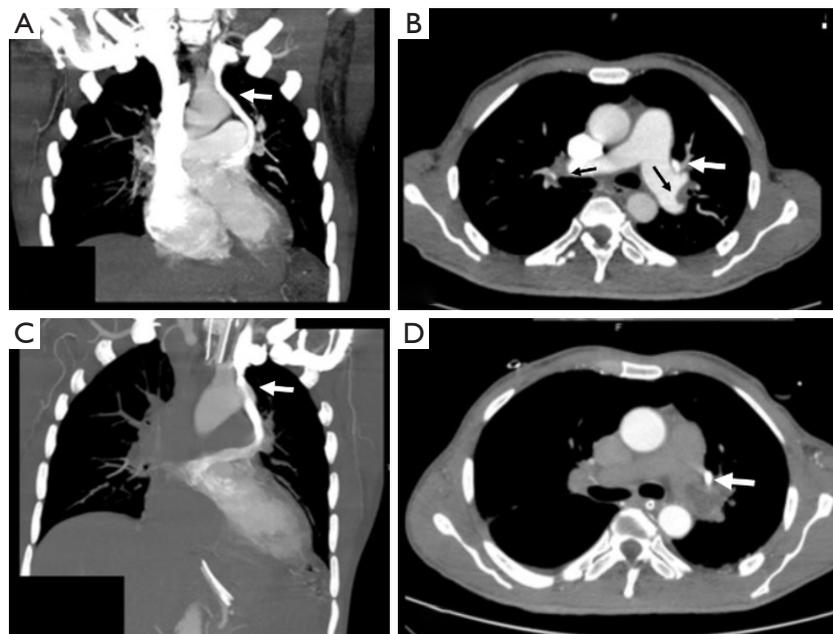
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Duplication of superior vena cava (SVC) has an estimated prevalence of 0.3%. Incomplete regression of anterior cardinal vein can lead to persistent left superior vena cava (PLSVC) and is associated with chronic hypoxemia and predisposition to systemic embolization from right-to-left shunt. Blood drainage to the left atrium is extremely rare.

A 59-year-old male with type 4 pulmonary hypertension was admitted with diagnosis of ischemic stroke after

withdrawal of systemic anticoagulation. Increased hypoxemia demanded invasive mechanical ventilation. Investigation confirmed embolization to the left medial cerebral artery and excluded conventional predisposing conditions to stroke. Deep vein thrombosis of lower limbs was excluded. CT scan after right side contrast injection showed pulmonary embolism (PE) and a duplication of SVC with filling of the four heart chambers and pulmonary arteries (*Figure 1A,B*).



**Figure 1** Coronal and axial views of CT scan. (A,B) Right side contrast injection showing pulmonary embolism (black arrow) and a duplication of SVC (white arrow) with filling of the four heart chambers and pulmonary arteries; (C,D) left side upper body contrast injection confirming a persistent left SVC (white arrow) with exclusive filling of the left heart chambers. SVC, superior vena cava.

Left side upper body contrast injection confirmed a PLSVC, contrasting exclusively the left heart chambers (*Figure 1C,D*).

We hypothesize that thrombus originating from the upper body migrated to cerebral arterial branches through the PLSVC and also to the pulmonary arteries, leading to the concurrent occurrence of stroke and PE. We believe that evidence of paradoxical embolization demands a search for PLSVC in cases where cardiac causes are excluded.

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### Footnote

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.