

Levoatrial Cardinal Vein: A Rare Differential

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Received Date: February 02, 2024; **Accepted Date:** February 13, 2024; **Published Date:** February 19, 2024

Citation: Ameya Kaskar, Supratim Sen, Hiren Paanwala, Gaurav Kumar, (2024), Levoatrial Cardinal Vein: A Rare Differential, *J. Clinical Cardiology and Cardiovascular Interventions*, 7(2); DOI:10.31579/2641-0419/350

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Abstract

Levoatrial cardinal vein is a rare congenital anomaly characterised by an anomalous connection between left atrium or pulmonary veins and systemic veins. This abnormal connection is usually found in cases of left sided obstructive lesions. In this report we present a case of ventricular septal defect and severe pulmonary hypertension. The suspicion of a levocardinal atrial vein was raised was on echocardiography and confirmed on computed tomography. A multimodality diagnostic approach is mandatory for the correct diagnosis and surgical repair of this anomaly as this can also be a contributing factor for causing severe pulmonary hypertension.

Keywords: fatigue; cognitive fatigue; motor fatigue; depression; post-covid; sars-cov2

Introduction

Levoatrial cardinal vein is a rare congenital anomaly characterised by an anomalous connection between left atrium or pulmonary veins and systemic veins. This abnormal connection is usually found in cases of left sided obstructive lesions. In this report we present a case of ventricular septal defect and severe pulmonary hypertension. The suspicion of a levocardinal atrial vein was raised was on echocardiography and confirmed on computed tomography. A multimodality diagnostic approach is mandatory for the correct diagnosis and surgical repair of this anomaly as this can also be a contributing factor for causing severe pulmonary hypertension.

Case Details

A 7 month-old (4kg) boy presented with history of failure to thrive with recurrent respiratory tract infections. On echocardiography, he was diagnosed to have a perimembranous ventricular septal defect (VSD), with an anomalous left-sided vessel, with ascending flow, communicating with the brachiocephalic vein. Possibility of a vertical vein consistent with anomalous pulmonary venous drainage was considered. Computed Tomography (CT) confirmed the existence of levoatrial cardinal vein from the left atrium to left brachiocephalic vein. He underwent surgical repair constituting VSD enlargement with intraventricular tunnel repair and simple ligation of the levoatrial cardinal vein. Post-operative echocardiography did not show any residual lesions and the patient made an uneventful recovery.

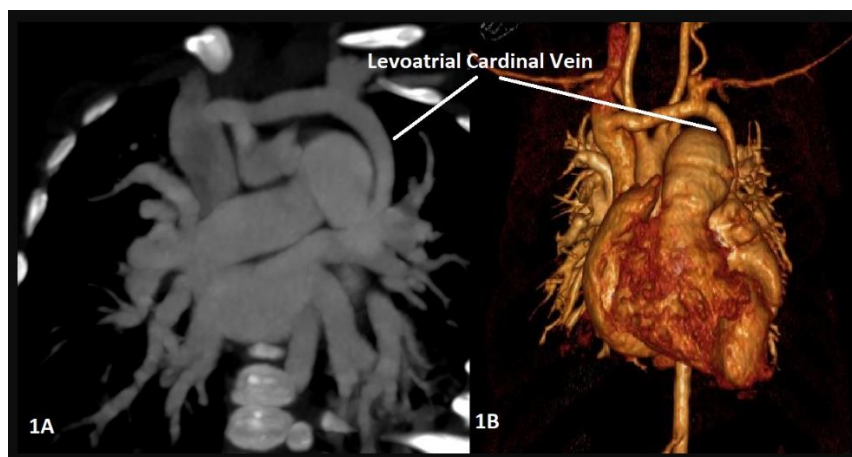


Figure 1A & 1B: CT and 3D reconstruction image showing levoatrial cardinal vein from pulmonary vein to brachiocephalic vein

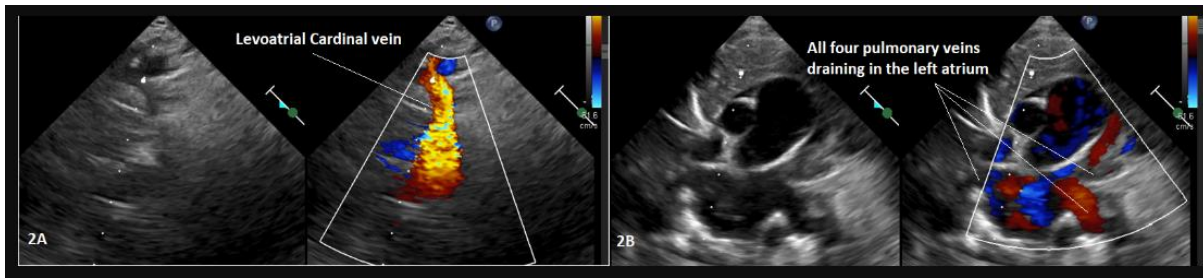


Figure 1A 2A: Echo image showing anomalous collateral vein from left atrium to brachiocephalic vein

Figure 1A 2B: Echo image showing all four pulmonary veins draining in the left atrium

Comment

Levoatrial cardinal vein is a rare congenital anomaly usually described in association with severe left heart hypoplasia or obstruction [1]. This vessel has also been described in association with other more common congenital heart defects without left ventricular hypoplasia [2] or rarely as an isolated lesion [3]. It is often argued to be a venous collateral channel between the pulmonary and the systemic venous channels which will be providing an overflow in the setting of left sided obstructive lesions, however with the advent of computer tomography more of these collateral channels are being diagnosed without left heart obstructive lesions [4]. 'Levoatrial cardinal vein' has been described broadly as a pulmonary to systemic venous collateral. This entity also includes collateral venous channel between the left atrium and the coronary sinus and coronary sinus defect providing interatrial communication [4]. Embryologically, this collateral venous channel is a remnant of the splanchnic venous plexus (which is present before the appearance of the definitive pulmonary vein), providing communications between the developing lungs and the systemic venous channels. The commonest site of drainage from the left atrial wall or one of the pulmonary veins has been into either the left brachiocephalic vein or the superior caval vein. Rarely, it may drain into the jugular and bronchial veins, coronary sinus, and left ventricular sinusoids. It may be easily missed on echocardiographic assessment due to its tortuous course in the superior mediastinum, close relationship with the main stem bronchus and pulmonary artery, and/or difficulties in imaging because of low flow and small size [5]. Differential diagnoses include a partial/total anomalous pulmonary vein connection, as the levoatrial cardinal vein can be confused with a vertical

vein draining the left pulmonary veins, and persistent left superior vena cava. The latter can be differentiated on echocardiography by the direction of the

flow, which is descending into the coronary sinus in left superior vena cava and ascending in a levoatrial cardinal vein. A levoatrial cardinal vein may be a source of persistent left-to-right shunt and cause clinical manifestations of chronic right heart volume overload later in life causing pulmonary hypertension. A multimodality diagnostic approach is mandatory for the correct diagnosis and surgical repair of this anomaly.

Acknowledgements: None

Conflicts of Interest: None

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DOI:10.31579/2641-0419/350

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