Case Report

Anomalous Left-sided Superior Vena Cava with Cephalad Flow

Gautam V. Ramani, Christopher Deible¹, Angé1 López-Candales²
Division of Cardiology, University of Maryland School of Medicine, Baltimore, Maryland, ¹Department of Radiology, University of Pittsburgh School of Medicine, Pittsburgh, PA, ²Division of Cardiovascular Medicine, University of Puerto Rico School of Medicine, San Juan, PR, USA

ABSTRACT

The case of a 24-year-old male with complaints of migraine headaches was referred for echocardiography. The rest of medical history was unremarkable. Agitated saline contrast bubble study showed evidence of a right to left intracardiac shunt, probably secondary to a patent foramen ovale. Results of a transesophageal echocardiogram suggested the possibility of an anomalous venous circulation and eventually identified as anomalous left-sided superior vena cava with cardiac magnetic resonance imaging.

Key words: Cardiac magnetic resonance imaging, echocardiography, left superior vena cava, migraines

INTRODUCTION

In this case report, a patient with complaints of migraine headaches was referred for echocardiography. Agitated saline contrast bubble study revealed the presence of a right to left intracardiac shunt. On transesophageal echocardiography an intact interatrial septum was identified. However, contrast bubbles were seen in the left atria arising from the left superior pulmonary vein after injection of agitated saline from the patient’s left arm, a finding not noted upon injection into the right arm.

We describe the thorough evaluation that demonstrated the presence of an anomalous left-sided vena cava with cephalad flow.

CASE REPORT

A 24-year-old male with an unremarkable medical history is referred for echocardiography with complaints of migraine headaches, and although normal cavity dimensions, biventricular and valvular functions were noted, agitated saline contrast bubble study showed evidence of a right to left intracardiac shunt, probably secondary to a patent foramen ovale (PFO) [Figure 1].

Transesophageal echocardiography was then performed but failed to show any evidence for either a PFO or an atrial septal defect (ASD). However, contrast bubbles were seen in the left atria after injection of agitated saline from the patient’s left arm. On closer inspection, the bubbles seemed to arise from the left superior pulmonary vein, a finding that was not noted upon injection into the right arm. These findings strongly suggested anomalous venous circulation of the thoracic vessels [Figure 2].

Cardiac computed tomography demonstrated a structure parallel to the aorta, coursing from the left upper pulmonary vein (LUPV) toward the left subclavian vein, suggesting either a left-sided superior vena cava (SVC) or less likely a partial anomalous pulmonary vein [Figure 3]. Subsequent cardiac magnetic resonance with phase contrast cardiac imaging was then performed which demonstrated cephalad blood flow within structure [Figure 4]. This finding most likely represents

Address for correspondence: Dr. Angel López-Candales, Division of Cardiovascular Medicine, University of Puerto Rico School of Medicine, Medical Sciences Building, PO Box 365067, San Juan 00936-5067, Puerto Rico, USA. E-mail: candales33@gmail.com

Access this article online

Quick Response Code:
Website: www.heartviews.org
DOI: 10.4103/1995-705X.206199

How to cite this article: Ramani GV, Deible C, López-Candales A. Anomalous left-sided superior vena cava with cephalad flow. Heart Views 2017;18:15-7.
a left-sided SVC despite the highly unusual cephalad blood flow and the caudal attachment to LUPV.

**DISCUSSION**

Approximately 2% of patients demonstrate abnormalities of the major thoracic venous vessels in the absence of otherwise significant structural heart disease. Interestingly, both left-sided SVC and partial anomalous pulmonary venous return occur in a frequency of approximately 0.2–0.6%. These entities are often confused as they both appear on routine imaging as an accessory structure lateral and parallel to the aortic arch.
Although a left-sided SVC will typically terminate in the coronary sinus owing to its embryology as a left common cardinal vein remnant, caudal attachments to the left atrium have been described. Typically, the left-sided SVC demonstrates caudal flow and the anomalous pulmonary vein will demonstrate cephalad flow. Partial anomalous pulmonary venous drainage is frequently associated with other congenital heart disease, most commonly an ASD, in 70% of patients. Typically, both of these conditions are incidental findings detected during radiography or during central venous line or device placement.

The relationship between patient’s anatomy and his chief complaint of migraine headaches remains unclear.

In summary, even though a left-sided SVC will typically terminate in the coronary sinus owing to its embryology as a left common cardinal vein remnant, caudal attachments to the left atrium demonstrating caudal flow and the anomalous pulmonary vein will demonstrate cephalad flow. However, this case illustrates an anomalous left-sided vena cava with cephalad flow. Since both these entities are often confused as they both appear on routine imaging as an accessory structure lateral and parallel to the aortic arch, we want to bring to the attention of clinicians involved with cardiac imaging interpretation an unusual case.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**REFERENCES**

1. Healey JE Jr. An anatomic survey of anomalous pulmonary veins: Their clinical significance. J Thorac Surg 1952;23:433-44.
2. Cormier MG, Yedlicka JW, Gray RJ, Moncada R. Congenital anomalies of the superior vena cava: A CT study. Semin Roentgenol 1989;24:77-83.
3. Dillon EH, Camputaro C. Partial anomalous pulmonary venous drainage of the left upper lobe vs. duplication of the superior vena cava: Distinction based on CT findings. AJR Am J Roentgenol 1993;160:375-9.
4. Ammash NM, Seward JB, Warnes CA, Connolly HM, O’Leary PW, Danielson GK. Partial anomalous pulmonary venous connection: Diagnosis by transesophageal echocardiography. J Am Coll Cardiol 1997;29:1351-8.