## CLINICAL IMAGE

# Patient with Persistent Left Superior Vena Cava Presenting as Acutely Decompensating Cardiac Arrhythmia

Ashwin Jagadish, BS,[1] Ahmed Khan, MD, FACC[2]

[1]Medical Student, East Tennessee State University, James H. Quillen College of Medicine, Johnson City, TN, USA
[2]Interventional Cardiologist, Ballad Health CVA Heart Institute, 310 N. State of Franklin Rd., Suite 400, Johnson City, TN, USA

Corresponding author: Ashwin Jagadish, East Tennessee State University, James H. Quillen College of Medicine, Stanton-Gerber Hall B206, PO Box 70582 (polineq@yahoo.com)

Received: 2/6/2023 Accepted: 6/16/2023 Published 6/30/2023

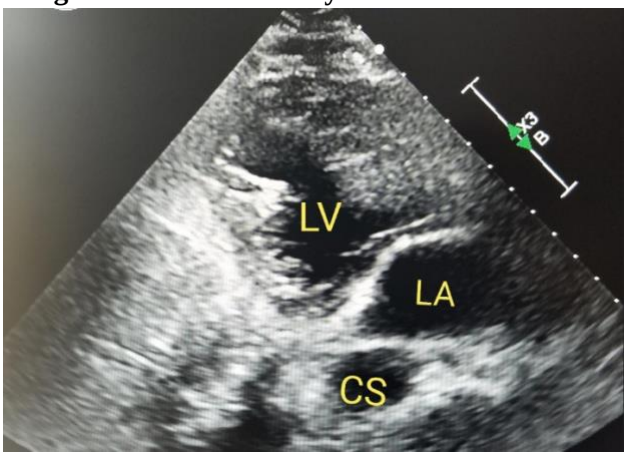
*Am j Hosp Med* Apr;7(2): 2023. DOI: https://doi.org/10.24150/ajhm/2023.005

Keywords: persistent left superior vena cava, complete heart block, ventricular tachycardia, dilated coronary sinus, pacemaker

## CASE PRESENTATION

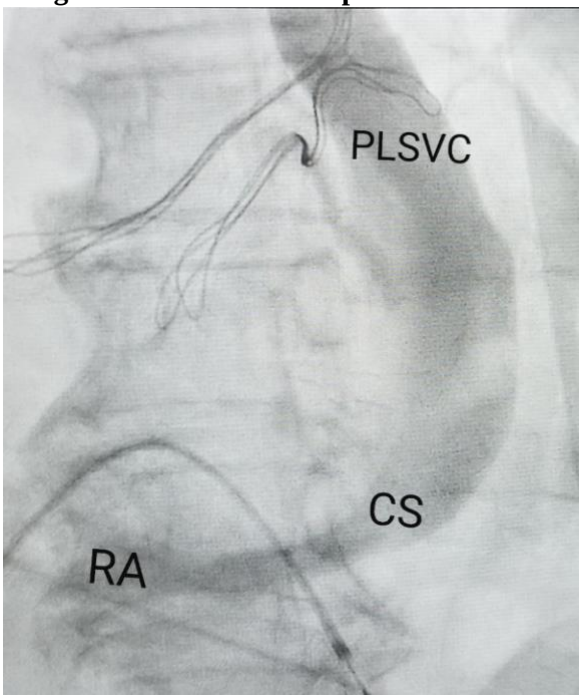
A 75-year-old female presented to an outlying emergency room with dizziness, nausea and vomiting. She was noted to be in complete heart block and rapidly deteriorated clinically with pulseless ventricular tachycardia needing CPR, mechanical ventilation and transcutaneous pacing. Her past medical history was positive for hypertension for which she took diltiazem 90 mg a day and benazepril. There were no recent changes in medication in over a year and no excess medicine use was reported. TSH level was normal. Potassium level was 3.4 mmol/L and had been supplemented prior to arrival. She was transported via helicopter to our facility, directly to the cardiac catheterization lab. The external pacer was noted not to be giving a consistently palpable pulse. A temporary pacemaker was placed emergently. A stat limited bedside echo suggested a dilated coronary sinus (Image 1). A coronary angiogram did not reveal coronary artery stenosis. Left ventricular ejection fraction was about 50%. A left subclavian venogram confirmed a persistent left superior vena cava (PLSVC) without communication with the right superior vena cava (SVC; Image 2). A right subclavian venogram revealed an angulated continuation into a right sided superior vena cava (Image 3). A decision was made to proceed with permanent pacemaker. A dual chamber permanent pacemaker was inserted via the right subclavian vein with caution due to the angulation noted. The patient was extubated less than 12 hours after the permanent pacemaker placement and discharged within 72 hours of arrival to our facility in fully ambulatory condition and normal mentation.

**Image 1. Dilated Coronary Sinus**



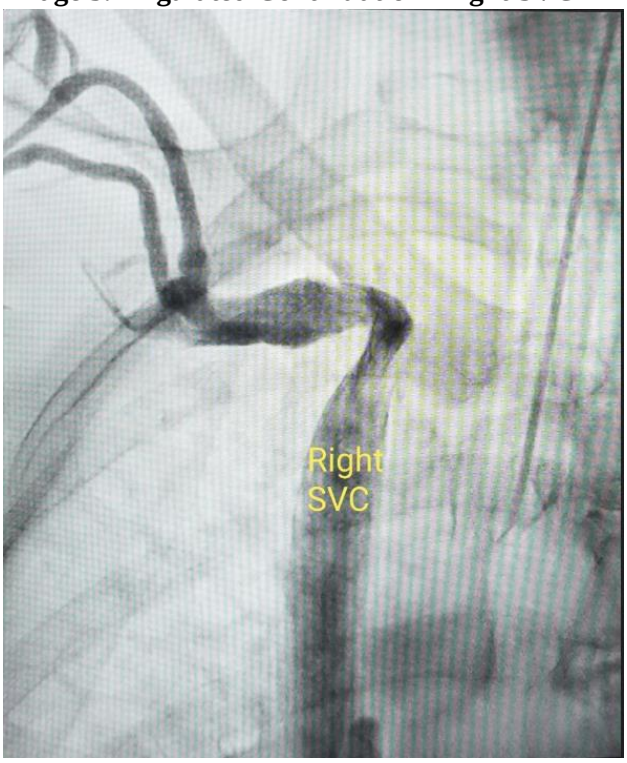

LV- Left Ventricle; LA- Left Atrium;
CS- Coronary Sinus

**Image 2. Persistent Left Superior Vena Cava**




PLSVC- Persistent Left Superior Vena Cava;
RA- Right Atrium; CS – Coronary Sinus

**Image 3. Angulated Continuation- Right SVC**




Right SVC- Right Superior Vena Cava

## DISCUSSION

PLSVC is associated with both tachyarrhythmia and cardiac conduction system abnormalities [1, 2]. It may be noted in about 0.5% of the population [1, 2]. It is often not identified until imaging is done for other diagnoses or cardiac device placements or radiography is done after line placements [2, 3]. Noting a dilated coronary sinus on echocardiogram should tip people into considering PLSVC [4]. Recognizing PLSVC in critically ill patients is helpful in limiting unnecessary delays in treatment as well as choosing the correct access site for device implant and decreasing hospital stay.

**Notes**
**Conflicts of interests:** None declared
**Funding:** None declared
**Acknowledgements:** None

## REFERENCES

1. D. R. Morgan, C. G. Hanratty, L. J. Dixon, M. Trimble, D. B. O'Keeffe, Anomalies of cardiac venous drainage associated with abnormalities of cardiac conduction system, *EP Europace*, Volume 4, Issue 3, July 2002, Pages 281–287, https://doi.org/10.1053/eupc.2002.0248

2. Morgan, L. G., Gardner, J., & Calkins, J. (2015). The incidental finding of a persistent left superior vena cava: Implications for primary care providers - Case and review. *Case Reports in Medicine, 2015*, [198754]. https://doi.org/10.1155/2015/198754

3. Gaillard F, Botz B, Harvey J, et al. Left-sided superior vena cava. Reference article, Radiopaedia.org (Accessed on 29 Jan 2023) https://doi.org/10.53347/rID-1573

4. Kurtoglu E, Cakin O, Akcay S, Akturk E, Korkmaz H. Persistent Left Superior Vena Cava Draining into the Coronary Sinus: A Case Report. Cardiol Res. 2011 Oct;2(5):249-252. doi: 10.4021/cr85w. Epub 2011 Sep 20. PMID: 28357015; PMCID: PMC5358287.