

Where did the line go? A case of a duplicated left superior vena cava

John A. Cuenca¹, Roberto F. Casal², Kamran Ahrar³ and Joseph L. Nates^{1,*}

¹Department of Critical Care Medicine, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

²Department of Pulmonary Medicine, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

³Department of Interventional Radiology, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

*Correspondence address. Department of Critical Care Medicine, Unit 112, The University of Texas MD Anderson Cancer Center, 1515 Holcombe Blvd., Houston, TX, USA. Tel: 713-792-5040; E-mail: jlntates@mdanderson.org

A 24-year-old male was transferred to our intensive care unit with acute leukemia, tumor lysis syndrome and bilateral pulmonary embolism. A peripherally inserted central catheter (PICC) was placed on the left brachial vein. A post-insertion chest X-ray showed an abnormal left mediastinum catheter trajectory (Fig. 1A). To rule out arterial placement, the following steps were taken: First, the catheter was transduced, exhibiting a

mean arterial pressure of 0 mmHg and no arterial waveforms. Second, blood gasses were performed on a PICC line blood sample (pH = 7.4, PaCO₂ = 47.1, PaO₂ = 35, HCO₃ = 29, saturation = 64%), which resembled venous rather than arterial blood. Third, a left arm ultrasound showed the PICC line in the brachial vein and a small left axillary vein nonocclusive thrombus. Fourth, the interventional radiology attending was consulted, and concurred

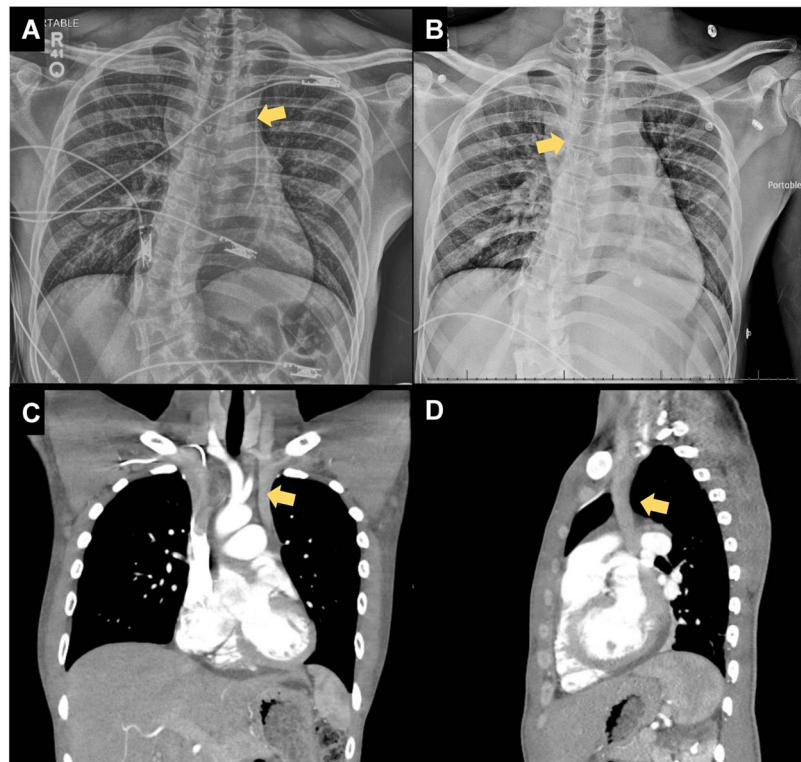


Figure 1. (A) Chest X-ray shows a PICC located the left mediastinum. (B) Chest X-ray displays the PICC relocated in the atrium. (C) and (D) Contrast chest CT shows the duplicate left superior vena cava.

Received: October 26, 2022. Revised: February 14, 2023. Accepted: March 15, 2023

© The Author(s) 2023. Published by Oxford University Press. All rights reserved. For Permissions, please email: journals.permissions@oup.com

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<https://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial re-use, please contact journals.permissions@oup.com

with the diagnosis of a left-sided superior vena cava (SVC). Due to the associated risks, the left PICC was removed, and a contralateral PICC was placed (Fig. 1B). After confirming that the tip of the catheter was located in the mid right atrium (Fig. 1B), the line was pulled 2 cm. A contrast computed tomography (CT) confirmed the presence of a duplicate left superior vena cava (Fig. 1C and D).

Each year more than 5 million central venous catheterizations are performed in the United States [1]. Ideally, the tip of the catheter should be located in the cavo-atrial junction between the lower third of the superior vena cava, and the upper portion of the atrium [2]. Although the malposition rate is relatively low (3.3%), it is affected by anatomical anomalies [3, 4]. A left-sided SVC is a congenital venous anomaly, and it can occur in up to 0.5% of the normal population [4]. In most cases, it drains to the coronary sinus and is asymptomatic. However, in rare instances (8%), it can drain the right atrium and cause right to left shunt [4].

ACKNOWLEDGMENTS

None.

CONFLICT OF INTEREST STATEMENT

None declared.

FUNDING

None.

ETHICAL DECLARATION

Informed consent was obtained.

PRIOR PRESENTATIONS

No.

REFERENCES

1. McGee DC, Gould MK. Preventing complications of central venous catheterization. *N Engl J Med* 2003;**348**:1123–33.
2. Fletcher S, Bodenham A. Safe placement of central venous catheters: where should the tip of the catheter lie? *Br J Anaesth* 2000;**85**:188–91.
3. Smit JM, Haaksma ME, Lim EHT, Steenvoorden TS, Blans MJ, Bosch FH *et al.* Ultrasound to detect central venous catheter placement associated complications: a multicenter diagnostic accuracy study. *Anesthesiology* 2020;**132**:781–94.
4. Gibson F, Bodenham A. Misplaced central venous catheters: applied anatomy and practical management. *Br J Anaesth* 2013;**110**:333–46.