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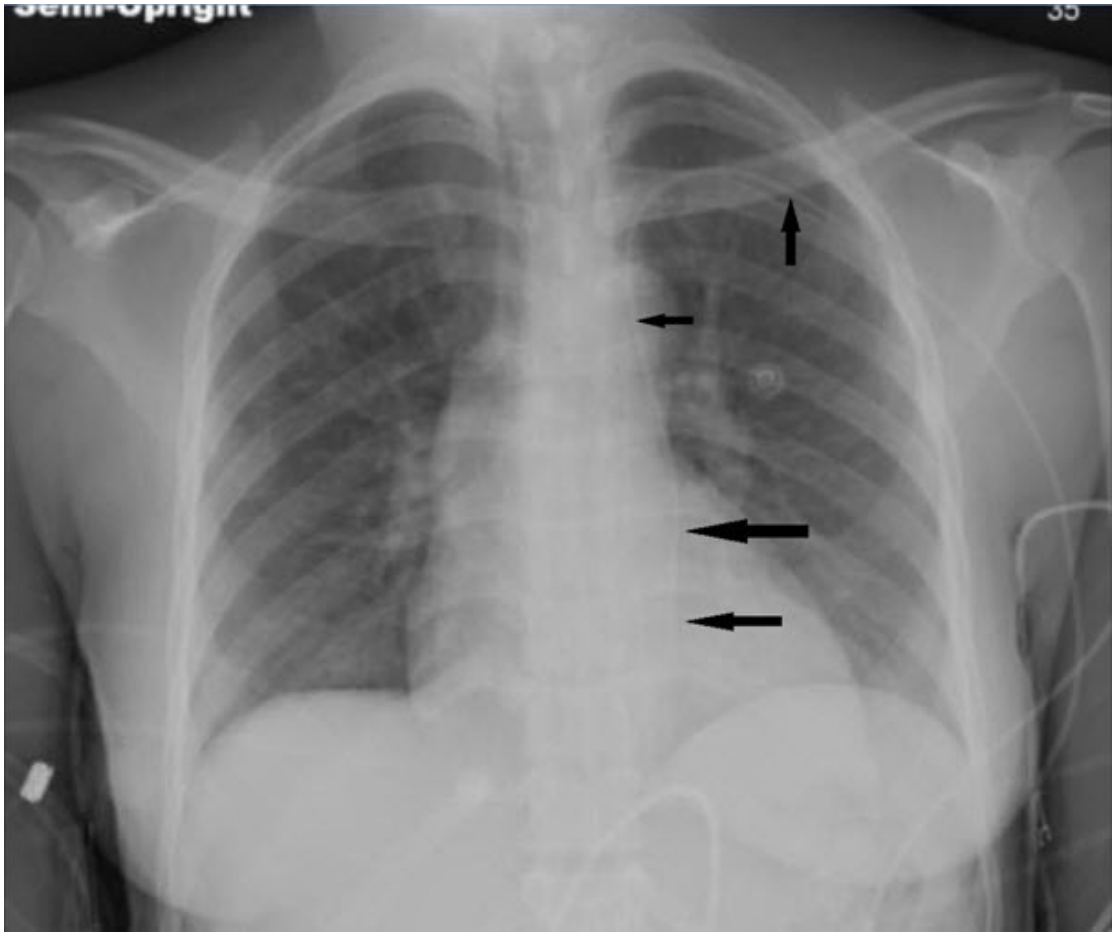
Can I use this central line?

Abdel Rahman Lataifeh, Khaled R Khasawneh

Clinical—A patient admitted to the ICU required a peripherally inserted central catheter (PICC).

Chest X-ray (CXR) demonstrated the PICC taking an unusual left parasternal course with the tip posterior to the left ventricle (Figure 1). Blood gas was consistent with venous blood.

Figure 1. CXR demonstrating the unusual left parasternal position of the PICC (black arrows)



Would you use this PICC line?

Answer—Review of previous CT scan confirmed the presence of bilateral superior vena cava with persistent left superior vena cava (PLSVC). See Figures 2 and 3.

Figure 2. CT chest scan with persistent left superior vena cava (top right arrow), right superior vena cava (left arrow) and aorta (lower right arrow)

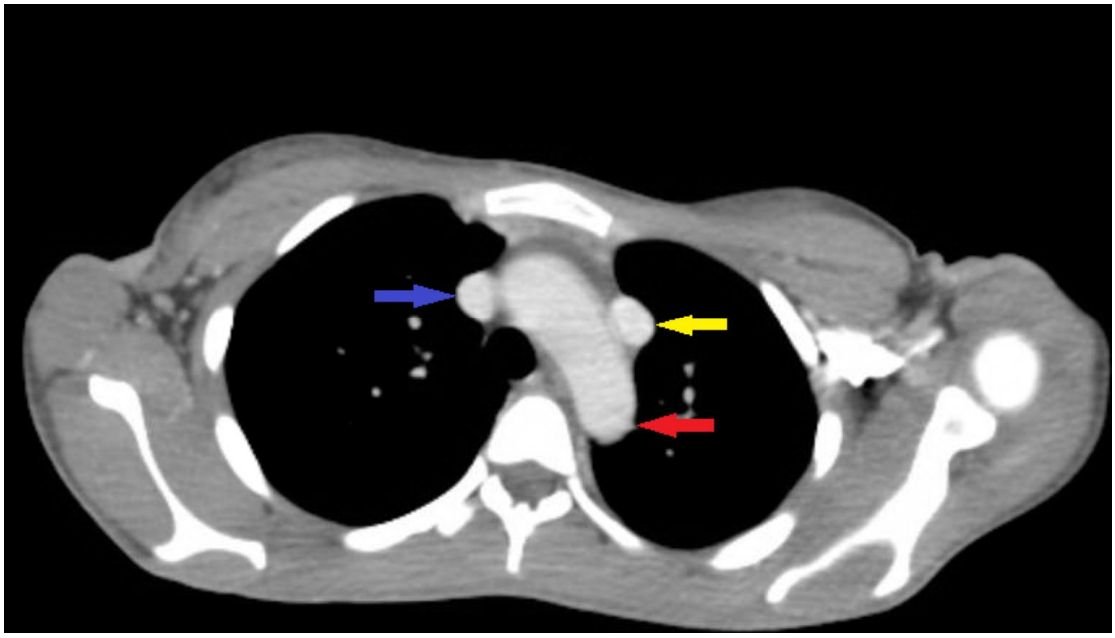


Figure 3. Left and right superior vena cava (arrows). PLSVC drains to the right atrium via the coronary sinus. The left subclavian and internal jugular veins drain directly to the PLSVC and the left brachiocephalic vein is absent

Discussion—PLSVC is a rare but clinically important anatomical variation. It affects 0.5% of the general population.[1] About 90% of PLSVC patients have a normal right-sided SVC and the PLSVC drain into the right atrium via the coronary sinus.[2]

In approximately 65% of the cases the left brachiocephalic vein is completely absent.[3]

PLSVC draining to the left atrium is associated with right to left shunt and higher incidence of cardiac arrhythmia.

PLSVC draining to right atrium is usually asymptomatic but it becomes clinically significant when patient has a central venous catheter (CVC), PICC line or pacemaker where it can be confused with intra-arterial, pericardial or pleural placement on CXR.

Blood gas analysis, waveform tracing, venography or chest CT should be used to confirm venous placement and to verify that the PLSVC is draining to the right atrium before using the central venous line.[3]

Learning objectives

- PLSVC is a rare anatomical variation with important clinical implications
- PLSVC drains to the right atrium via the coronary sinus in 90% of the cases
- CVC that are placed from the left side in patients with PLSVC have a misleading appearance on the CXR that mimics intra-arterial or extravascular position
- When PLSVC is suspected after CVC placement, further testing is needed to confirm venous placement and that the PLSVC drains to the right atrium before the CVC can be used

Author information: Abdel Rahman Lataifeh, Khaled R Khasawneh. Division of Pulmonary and Critical Care Medicine, University of Arkansas for Medical Sciences, Little Rock, Arkansas, USA

Correspondence: Khaled R Khasawneh, MD, Assistant Professor of Medicine, Division of Pulmonary and Critical Care Medicine, University of Arkansas for Medical Sciences, 4301 W. Markham St, Slot 555, Little Rock, AR 72205, USA. Fax: +1 (0)501 6867893; email: Krkhasawneh@uams.edu

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