Abnormal central line position on a chest radiograph: Clue to an uncommon anomaly

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**CASE**

A 20-year-old unbooked pregnant lady, G3P2L1 with 37 weeks gestation with eclampsia, presented to the casualty in status epilepticus. Her trachea was intubated, seizures managed, and she was taken up for an emergency lower segment cesarean section, and subsequently shifted to the Intensive Care Unit (ICU) for elective ventilation. A computed tomography (CT) of the brain (not shown) revealed a brainstem bleed. In the ICU, a central venous line was inserted via the right subclavian approach.

The postprocedure frontal chest radiograph revealed an abnormal course of the venous catheter, which was seen to cross the midline, and its tip was seen in the left superior mediastinal/paramediastinal region [Figure 1, arrow].

The second central line was then inserted via the right internal jugular vein (IJV), which was also seen to follow a similar course, i.e., toward the left superior mediastinum (not shown). This was subsequently removed, and the third line was inserted on the contralateral side via the left IJV. All three central line insertions were uneventful; blood gas samples were drawn freely and were suggestive of venous (and not arterial) placement.

On repeat chest radiograph, the venous catheter inserted via the left IJV was seen to descend vertically along the left side of the mediastinum, and its tip was seen below the level of the left hilum [Figure 2, long arrow].

**QUESTION**

What is the likely diagnosis?
ANSWER

Persistent left superior vena cava (PLSVC).

A contrast enhanced CT of the chest was done to confirm the diagnosis, and for the depiction of the venous anatomy. It revealed a PLSVC associated with the absence of right-sided SVC [Figure 3]. The left SVC was seen to drain into the coronary sinus. No other vascular or cardiac anomalies were evident. At the time of CT, two central venous catheters were seen in situ (the right subclavian and the left IJV catheters). The tip of the right subclavian venous catheter was seen at the confluence of the right brachiocephalic vein with the left SVC, and the tip of the left IJV catheter was seen within the left SVC, just proximal to its opening into the coronary sinus.

Differential diagnoses of a left paramediastinal position of a central venous catheter include the location within a vein – including PLSVC, left internal thoracic vein, superior intercostal vein or left pericardiophrenic vein, location within an artery (via subclavian artery to descending aorta) or an extravascular position in the mediastinum, pericardial, or pleural cavity. Being able to freely withdraw blood helps exclude an extravascular location of the catheter, and blood gas analysis confirms a venous placement.

A PLSVC occurs due to the abnormal persistence of the left anterior cardinal vein. It is the most common thoracic venous anomaly, found in 0.3–0.5% of the population, and in 5–10% of cases with congenital cardiac anomalies.[1] More than 80% of cases are seen to exist along with a right-sided SVC, and majority drain via the coronary sinus into the right atrium. Drainage into the left atrium may occur in association with cardiac congenital anomalies.[2]

Awareness about this anomaly enables a prompt diagnosis. Elucidation of the vascular anatomy is important in suspected cases as difficulty may be encountered in attempted pulmonary artery catheter or pacemaker placement. The manipulation of central venous catheters through the coronary sinus may result in complications such as hypotension, angina, or cardiac arrhythmias.

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