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IMAGES IN NEPHROLOGY

Isolated persistent left-sided superior vena cava in a patient with end-stage kidney disease

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ABSTRACT

An adult male of Asian origin with end-stage kidney disease secondary to diabetic nephropathy, was found to have a persistent left-sided superior vena cava (PLSVC) that drained into the coronary sinus, without an associated right-sided SVC, following the placement of a haemodialysis catheter. A persistent left-sided SVC arises from the failure of obliteration of the embryological left anterior cardinal vein. It is a rare finding and is usually asymptomatic. Given that nephrologists manage patients who may require vascular access, knowledge of the possibility of vascular anomalies may assist in preventing vascular injuries. Guidewires and dilators should be handled with utmost care to prevent vascular injury and the risk of cardiac rupture. Routine imaging should be performed to evaluate the position and course of central venous catheters after insertion so that vascular anomalies such as PLSVC can be identified timeously.

Keywords: vascular anomaly; persistent left-sided superior vena cava; dialysis.

CASE PRESENTATION

The patient was a 53-year-old Asian male known with chronic end-stage kidney disease, secondary to long-standing diabetic nephropathy. He was initially on peritoneal dialysis for six months and, owing to Tenckhoff catheter malfunction, was evaluated for a modality switch to haemodialysis.

During management of the blocked Tenckhoff catheter, a vascular anomaly was suspected after an upper body venogram was performed in order to evaluate the suitability of the venous system for the placement of a tunnelled haemodialysis catheter. Subsequent findings on computed tomography angiography (CTA) showed the right-sided subclavian dialysis catheter traverse the mediastinum, the tip located to the left within a persistent left-sided superior vena cava (SVC) (Figure 1).

Both the right and left subclavian veins drained into the persistent left-sided SVC, which in turn drained into the coronary sinus and finally into the right atrium (Figure 2). In addition, a thrombus was incidentally detected in the distal left pulmonary artery, extending into the anterior upper lobe branches.

DISCUSSION

In our case study, a noteworthy finding was the presence of a left-sided SVC that drained into the coronary sinus, with the absence of a right-sided SVC. This condition is known as persistent left superior vena cava (PLSVC) and is present in 0.5% of the general population and 10% of those with congenital heart disease [1-5]. Most cases are accompanied by a normal right-sided SVC and is termed SVC duplication [1-5]. Knowledge of their potential presence necessitates careful insertion of tunnelled lines, to prevent vascular injury. Typically, PLSVC is asympto-

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matic, but it can occasionally be associated with conditions such as atrial fibrillation, congenital heart disease, or right-to-left shunts leading to paradoxical thrombo-embolic diseases [1-5]. The increasing use of imaging techniques has led to more frequent detection of PLSVC by primary care physicians [6].

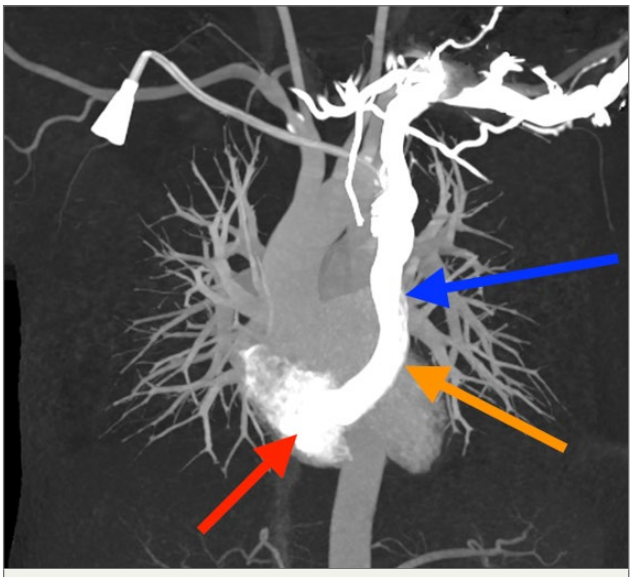

Figure 1. Computed tomography angiography.
Maximum intensity projection computed tomography angiography coronal image demonstrating injection of contrast via the left subclavian vein, draining into the left-sided SVC (blue arrow) and into the right atrium (red arrow) via the coronary sinus (orange arrow).

In the context of patients with end-stage kidney disease requiring haemodialysis, vascular access procedures have become routine and lifesaving. Most often, ultrasound-guided haemodialysis catheter insertions are performed with minimal complications. On rare occasions, anatomical vascular anomalies can complicate catheter placement. In such cases, it is crucial to handle guidewires and dilators with utmost care to prevent vascular injury and the risk of cardiac rupture.

CONCLUSION

A chest radiograph should be performed routinely to evaluate the position and course of central venous catheters after insertion so that vascular anomalies such as PLSVC can be identified in time. Guidewires and dilators should be handled with utmost care to prevent vascular injury and the risk of cardiac rupture. Comprehensive imaging studies are indispensable for accurately delineating these abnormalities and planning appropriate vascular access strategies.

Conflict of interest

The authors have no conflicts of interest to declare.

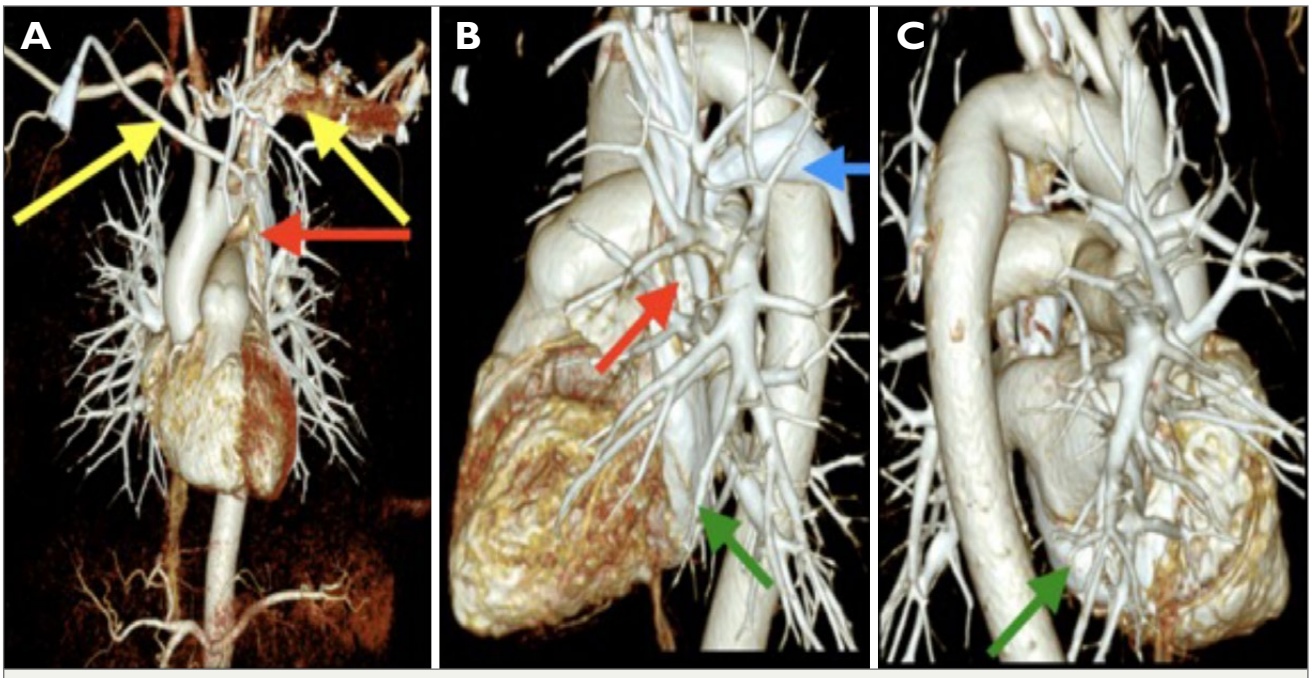

Figure 2. Three-dimensional volume reconstruction images in multiple views.
(A) anterior, (B) left posterior oblique, (C) right posterior oblique. The central venous catheter, via the right subclavian vein, demarcates the course of the right brachiocephalic vein. The right and left brachiocephalic veins (yellow arrows) drain into the persistent left-sided superior vena cava (red arrow). Note the absence of the usually located right superior vena cava. The hemiazygous vein drains into the left-sided superior vena cava (SVC) (blue arrow). The left-sided persistent SVC (red arrow) drains into the dilated coronary sinus (green arrow) into the right atrium.

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