

Persistent Left SVC- Can it be Used for Dialysis?

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1. Introduction

Persistent left sided Superior vena cava (PLSVC) is encountered in 0.3% of healthy population and majority of times gets incidentally detected during a left sided internal jugular catheter insertion or during electrophysiological studies. There are couple of reports where after its accidental cannulation, dialysis has been continued for a variable period of time.

We report a case where PLSVC was incidentally detected after left sided cannulation of Internal jugular vein. Dialysis was successfully continued through this route for next seven months, till the catheter got thrombosed.

2. Case Report

A 26-year-old lady on regular maintenance hemodialysis for basic disease IgA nephropathy, came to us for vascular access creation after her right IJ catheter got thrombosed. She was on thrice a week dialysis for last 2 years and two attempts to make AV fistula had failed. An uneventful Left sided IJV catheterization was done. Surprisingly a check X-ray showed that catheter was lying on the left side of sternum (Figure 1). For fear of wrong cannulation into some other vessel, arterial blood gas analysis and echocardiography was done which suggested Left sided superior vena cava. A Contrast enhanced CT confirmed the diagnosis. It was draining into coronary sinus and eventually in right atrium (Figure 2). We started the dialysis through this catheter, initially keeping the blood flow rate of 200-250 ml/min and keeping a watch on hemodynamic compromise or arrhythmias. As there was no complication, blood flow rate was increased to 300 ml/min. Patient has been on thrice a week dialysis through this access for the last 7 months without any complication.



Figure 1: Plain X-ray showing Cuffed catheter lying on left side of sternum

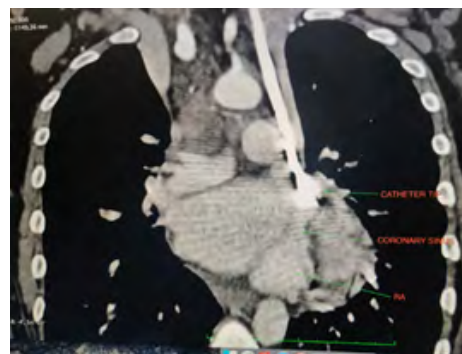


Figure 2: CT venography showing catheter in left SVC with dilated coronary sinus and right atrium(RA)

3. Discussion

PLSVC is the most common congenital anomaly of thoracic venous circulation encountered in 0.3- 0.5% population and in 4.5% in those with congenital heart disease. It generally gets detected accidentally during cannulation of left Internal jugular vein or during

pacemaker placement. Majority of times (92%), it drains through coronary sinus into right atrium and rarely into left atrium [1-3]. Embryologically human left SVC originates in the third week of the embryonic period, and then the left anterior cardinal vena cava gradually atrophies and finally degenerates into the ligament of Marshall. If the degeneration is not complete, then the remains of a pipeline structure after birth is PLSVC. Based on anatomy, Schummer [4] classified SVC into 3 types. Type I, normal anatomy; type II, only persistent left superior vena cava; type IIIa, right and left superior vena cava with connection; type IIIb, right and left superior vena cava without connection.

Based on the drainage characteristic, Zhu [5] classified PLSVC, into 4 types. Type A- PLSVC draining blood to the right atrium via coronary sinus, type B- PLSVC draining blood to the right atrium via coronary sinus with partial right-to-left shunt, type C- PLSVC drains blood to left atrium directly with right-to-left shunt and type D- PLSVC is directly connected to left pulmonary vein (coronary sinus absent)

Our case fits into Schummer's type III b class and based on drainage into Zhu's type A and this combination is the most common. Many workers have reported uneventful catheterization like in our case [1-3]. Most of the times PLSVC drains into right atrium through coronary sinus. Because of higher blood flow, sinus gets dilated and enlarged. An enlarged coronary sinus on echocardiography is a hint towards PLSVC. Due to coronary sinus stimulation by catheter, few cases of arrhythmia, angina, stroke and shock have been reported. If PLSVC drains into left atrium, there is usually a cardiac septal defect like atrial or ventricular. It can have dangerous outcome for patient, as there may be cyanosis and fear of systemic embolization.

Whether dialysis should be continued through PLSVC, is not an easy answer. If it is draining into Left atrium, dialysis is not possible. If it is draining into right atrium through coronary sinus, dialysis can be offered if there is no hemodynamic compromise/arrhythmia following catheter insertion and dialysis. It is suggested that to avoid irritation of coronary sinus, the catheter tip (which is normally placed in right atrium), should be placed at lower end of PLSVC as it is not possible to place it in right atrium and it is not advisable to place it in coronary sinus. As cardiac arrhythmias have been reported even after 2-3 sessions of dialysis, it is prudent to be aware of this possibility.

A check X-ray showing IJV catheter on left side of sternum, after left sided IJV cannulation may prompt nephrologist to remove the catheter fearing cannulation of an artery. However, if fluoroscopy guided / real time ultrasonography guided cannulation is done, such fear gets obviated. Arterial blood gas analysis also removes fear of arterial cannulation. Catheter lying on left side of sternum should make one suspect of PLSVC and a dilated coronary sinus on echocardiography gives an additional hint. Echocardiography

generally gives the diagnosis and CT angiography confirms the diagnosis. Cardiac catheterization is the gold standard for diagnosis of PLSVC, however to avoid invasive procedure thoracic enhanced CTA is an alternative [6]. He et al [7], on compilation of data, found 28 case reports of PLSVC among dialysis patients, 12 had tunneled cuffed catheter placement and 16 non-cuffed catheters. Dialysis has been performed in some of these patients for variable a period of time (2-32 months) and few complications like angina, stroke, arrhythmias etc. have also been reported.

We are reporting the case to bring awareness among nephrologists (proceduralist) of this rare entity. Dilemma of continuing dialysis in such cases is not straight forward. We feel PLSVC can be used as vascular access (like in our case) provided it is providing adequate blood flow and is draining in coronary sinus and into right atrium. It is prudent to look for any complication like arrhythmias during initial dialysis sessions.

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