

Persistent Left Superior Vena Cava Diagnosed During Haemodialysis Catheter Placement – A Case Report

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INTRODUCTION

Persistent left superior vena cava (PLSVC) is one of the congenital anomalous entry of the great veins. We described a case of PLSVC which was missed and then diagnosed incidentally on second attempt of catheter insertion of the left side.

CASE REPORT

SB was a patient from a rural town in Sabah, he was diagnosed with systemic lupus erythematosus (SLE) with proliferative lupus nephritis in May 2007. Despite the aggressive treatment with chemotherapy to control the activity of lupus nephritis, his renal function continued to deteriorate, and eventually he went into end-stage renal disease.

The vascular access preparation for this patient was poor due to poor accessibility to surgical service, and his peripheral veins were not good for arterio-venous fistula. He was initiated on haemodialysis with a right sided internal jugular catheter (IJC). The right IJC was removed due to infection. There was previously a documented attempt to insert a left sided IJC in September 2010, however the catheter was immediately removed as post-procedure chest x-rays showed that the catheter was inside the left atrium. The procedure was repeated again the next day, and the chest x-rays showed the same finding, and the catheter was removed. He was then put on dialysis using right femoral catheter as a temporary measure, as his right internal jugular vein was not visualised on ultrasound scanning. The patient refused to switch the dialysis modality to peritoneal dialysis. We proceeded to insert a cuffed catheter in the femoral vein. He remained well on haemodialysis until May 2012, when he developed a catheter-related infection. The femoral cuffed catheter was removed, and a left IJC was attempted and inserted again. The chest x-rays (figure 1) showed the catheter was entering into the left atrium. A conventional venogram was done which was not conclusive, and a CT venogram was arranged. The CT venogram showed the catheter was in the left internal jugular vein, both left subclavian and brachiocephalic veins united to drain into the vein with the catheter in-situ which descended into the left atrium (figure 2). Another vein was seen at the junction of the left subclavian and left internal jugular crossing the midline and draining into the right superior vena cava (SVC) in keeping with the left brachiocephalic vein. The findings were suggestive of a double SVC with a persistent left SVC draining into the left atrium.

Unfortunately this patient then developed pancytopenia and infective endocarditis, and despite high dose antibiotics, he succumbed in August 2012.

The presence of PLSVC in this patient could have been diagnosed in September 2010. However, the catheter was quickly removed in view of the abnormal finding on the chest X-rays. It was not until the femoral tunneled catheter was infected, and another attempt was then made for the left internal jugular catheter insertion in May 2012 that the PLSVC was eventually diagnosed.

DISCUSSION

PLSVC has an estimated prevalence of 0.3 – 0.5%.¹⁻⁵ It may be associated with other congenital cardiac anomalies such as atrial septal defect, ventricular septal defect or atrio-ventricular septal defect¹. In our case, there was no evidence of the defects as many trans-thoracic echocardiography had been performed.

Lim et al¹ reported a similar case and they performed the procedure under fluoroscopy. They initially thought it was an arterial puncture, and after realising they indeed punctured the vein, they proceeded to the insertion of the catheter. A digital subtraction angiography revealed the PLSVC, and the patient was haemodialysed using the catheter for five months without any problem. Jang et al² described another case when they had to insert a left sided temporary dual lumen catheter for a patient with fistula failure, and the chest x-rays showed that the catheter tip was on the left paramediastinal side (as with our case). They did not remove the catheter immediately, instead they confirmed the location of the catheter by CT scan, and confirmed the diagnosis of PLSVC. Stylianou et al³ reported another case of PLSVC which was incidentally diagnosed after the procedure was done and the chest x-rays showed the abnormal position of the catheter tip. They proceeded to CT scan and 3D transthoracic echocardiogram to confirm the diagnosis. The patient used the catheter for dialysis for a month before she was able to use the newly fashioned graft. Sriramaveen et al⁴ also reported a 50-year-old man with PLSVC, and a blood sample revealed it to be venous in origin, and subsequent CT angiography confirmed the presence of PLSVC with connection between right and left SVC. Kuppusamy et al⁵ also reported a case of PLSVC, and the catheter was used successfully for dialysis.

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Fig. 1 : The chest x-rays showed the catheter was entering into the left atrium.

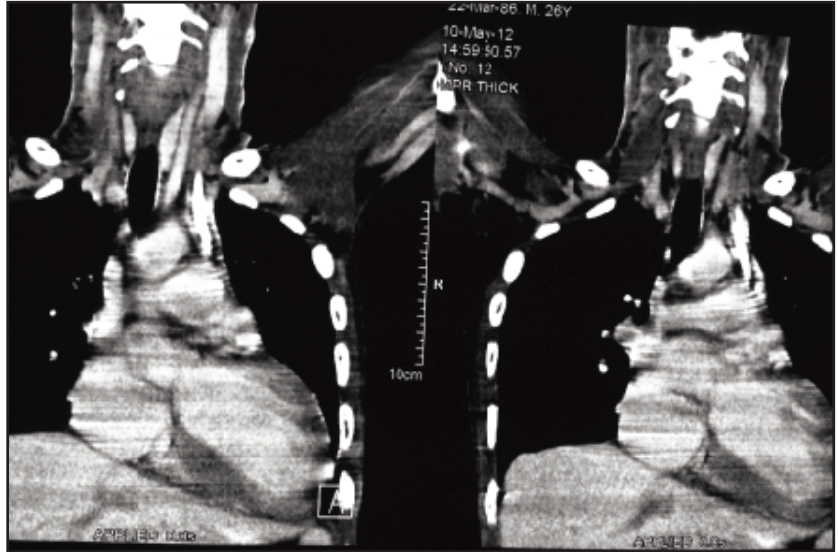


Fig. 2 : The CT venogram showed the catheter was in the left internal jugular vein, both left subclavian and brachiocephalic veins united to drain into the vein with the catheter in-situ which descended into the left atrium.

As the incidence of end-stage renal disease is increasing in Malaysia, and renal replacement therapy especially haemodialysis is getting more available throughout Sabah, even in the rural areas, insertion of catheter is commonly done nowadays. It is therefore important for clinicians doing haemodialysis catheter insertion to be aware of such congenital anomaly to prevent misinterpretation of the chest radiography. A few authors reported the safe use of the dialysis catheter in PLSVC. It is important to exclude other associated congenital anomalies such as septal defects as thrombosis or infection of the catheters may lead to systemic embolism. The dialysis catheter should be done with real-time ultrasound guidance to ensure the proper placement of the catheter into the vein and to avoid arterial puncture. Fluoroscopy is not readily available in many hospitals, and usually it is not used for temporary catheter insertion. If arterial puncture is unlikely, following the abnormal position revealed by the chest x-rays, blood gases can be done to confirm the venous origin, and a CT angiogram can be used to confirm the position of the catheter. An echocardiogram would be important to exclude other cardiac anomalies.

There was a proposed classification of PLSVC. Type I is normal anatomy, Type II only PLSVC, and Type IIIa is of right and left SVC with connection, and Type IIIb right and left SVC with no connection. Our case seemed to be of Type IIIa.

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