

# Cardiac resynchronisation therapy device implantation in a patient with persistent left superior vena cava: is it still a challenge?

Implantacja urządzenia do terapii resynchronizującej serca u pacjenta z przetrwałą lewą żyłą główną górną: czy to wciąż wyzwanie?

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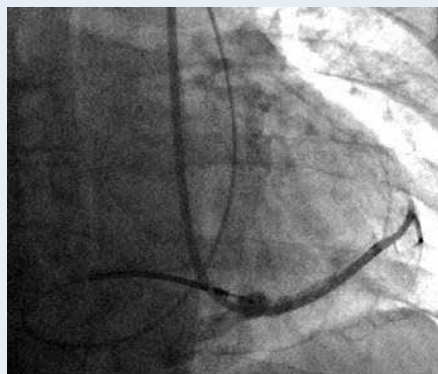
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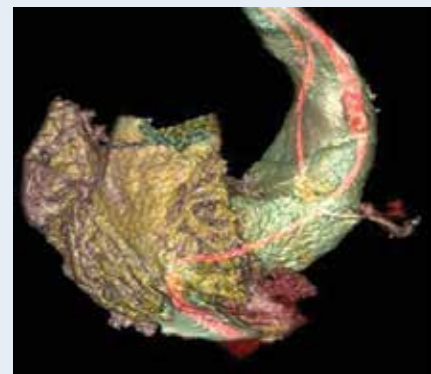
Persistent left superior vena cava (PLSVC) is a rare (0.3–1%) and usually asymptomatic abnormality in healthy subjects. It appears during the embryonic development when the left anterior cardinal vein remains patent instead of forming the remnant ligament of Marshall. Entering the right atrium via the coronary sinus, the PLSVC drains the upper part of the body. When discovered incidentally during central venous catheterisation for pacemaker implantation, this situation may be challenging for a proper positioning of the endocardial leads. We present the case of a 65-year-old man with a history of dilated cardiomyopathy, left ventricular ejection fraction 20%, left bundle branch block, New York Heart Association class III refractory to conventional therapy, and permanent atrial fibrillation, referred for implantation of a cardiac resynchronisation therapy device (CRT)-D. The presence of a unique left superior vena cava was noted previously on a computed tomography (CT) scan (Fig. 1) showing the ostia of the middle cardiac vein and the lateral coronary vein. Their branches could not be entirely opacified due to an important blood flow in the PLSVC. Following the left subclavian vein approach, a conventional left ventricle access sheath (Medtronic Ability) was advanced to the PLSVC, and the contrast injection showed only a lateral vein forming an acute angle with the PLSVC axis. A DURATA 7122 (St. Jude Medical) lead was firstly advanced in the PLSVC and then screwed in the apex of the right ventricle. While placed in the right atrium the lead needed to be turned 180° using a hand-shaped stylet, in order to reach the right ventricle (Fig. 2). The initial electrical parameters were satisfactory. The left coronary vein was then catheterised with a bipolar over-the-wire lead (Medtronic Ability 4296) positioned in front of its ostium using the same curved sheath. The inner 0.035 guide wire was introduced in the vein permitting the lead placement. The stimulation threshold was 1 V and there was no phrenic nerve stimulation. The final position of the leads is shown on the post-implant CT-scan (Fig. 3). The patient's haemodynamic status was satisfactory, and his electrocardiogram showed a 20-ms shortening of the QRS complex duration. The position of the leads and the electrical parameters were unchanged. Using modern imaging possibilities, suitable materials and appropriate operative techniques can increase the success rate of CRT device implantation in patients with PLSVC. Their responsiveness to this therapy and long-term clinical outcome remain to be evaluated.



**Figure 1.** Computed tomography scan posterior view of the persistent left superior vena cava showing the lateral coronary vein and the middle cardiac vein



**Figure 2.** 30° left anterior oblique per-procedural fluoroscopic view showing the right ventricular defibrillation lead and the lateral coronary vein



**Figure 3.** Computed tomography scan post-implant anterior view showing the final position of the defibrillation lead and the left ventricular lead

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**Conflict of interest:** none declared

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