

PERMANENT PACING OF THE HEART VIA A CORONARY SINUS BRANCH

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Transvenous right ventricular endocardial pacing has become the routine method of cardiac pacing among most surgeons. Lead placement in the coronary sinus is sometimes encountered, but usually promptly recognized and corrected. Conversely, in the presence of a congenital venous anomaly, electrode placement in a cardiac vein may not be easily recognized, as it mimics right ventricular apical position.¹ The course of a long-term pacing from a cardiac vein is not known. We report here a case of a persistent left superior vena cava (PLSVC) in which a pacing lead via the left subclavian vein was inadvertently placed in a tributary of the coronary sinus, with effective cardiac pacing for two years.

Case Report

A 60-year-old Saudi man was admitted with a four-week history of dizziness. There was no history of palpitation or chest pain. He had been diagnosed with hypertension and bronchial asthma five years prior to presentation, and diabetes mellitus type II a year later. The patient was on enalapril and salbutamol inhaler. His diabetes mellitus was controlled by diet. He stopped taking the enalapril a month prior to his presentation after he linked it with the development of dizzy spells.

On examination, the patient was conscious and alert. His blood pressure was 160/90 mm Hg, while the pulse was 80/min with occasional irregularity. Chest examination showed a barrel-shaped chest with coarse crepitations scattered all over. No ronchi were heard. The rest of the physical examination was normal.

A Holter monitor showed several sinus pauses, the longest of which was 2.5 sec. Two short episodes of paroxysmal supraventricular tachycardia were also recorded. Blood urea nitrogen, creatinine and serum electrolytes, and blood sugar were normal. A corrected sinus node recovery time of 2040 msec was recorded

(normal <525 msec)² after the insertion of a temporary pacemaker via the right femoral vein. The patient was taken to the operating room where, under local anesthesia, a transverse skin incision at the inferior border of the left clavicle was made and a pocket to host the pulse generator was created between the pectoral's major muscle and the pre-pectoral fascia. Through the same incision, the left subclavian vein was punctured, and using Seldinger's technique, a transvenous lead was introduced. An image intensifier was used to direct the pacing lead to the apex of the right ventricle. It was difficult to position the lead at the apex of the right ventricle, as the tip of the lead tended to deflect away from the tricuspid orifice. After repeated trials and after ensuring that the threshold for pacing (1 mv) and the ability of the pacemaker to sense were good, the lead was left in this functional, though not ideal position. Valsalva's maneuver did not displace the tip of the lead.

Postoperative ECG showed a normally functioning pacemaker but a QRS (the principal deflection in an electrocardiogram) with RBBB (right bundle branch block) configuration. The chest x-ray showed an abnormal course and position of the pacemaker lead and its tip (Figure 1). It was assumed that the pacemaker lead was pacing the heart from a branch of the coronary sinus. An angiogram of both the left and right subclavian venous systems showed a PLSVC (Figure 2) which drained to a huge coronary sinus, through which the pacemaker lead passed into one of its tributaries. The right vena cava system was normal. The patient was offered a corrective procedure to reposition the lead but refused a second operation. The patient has been followed for two years. He has no dizziness or syncope and his pacemaker is functioning normally, with the last measured pacing threshold of 1 mv and pulse width of 0.6 msec.

Discussion

The presence of a PLSVC is considered to be one of the most frequent anomalies of the systemic venous return. It is found in 0.3%-0.5% of the general population and 3%-10% of patients with congenital heart disease.^{3,4} In itself, it causes no hemodynamic disturbance, because it harmlessly drains into the right atrium via the coronary sinus.^{4,5} It

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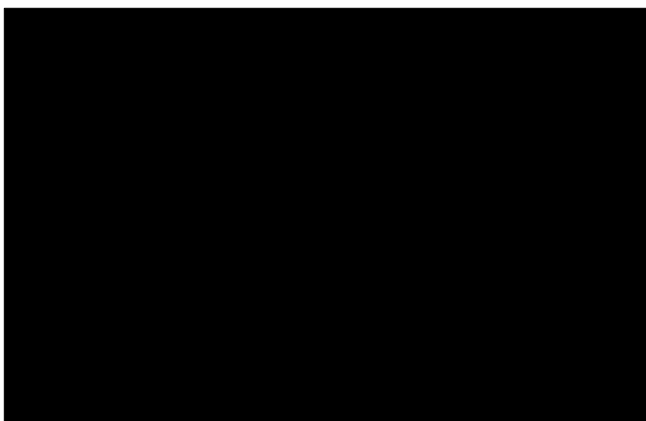


FIGURE 1. Plain PA (left) and lateral (right) chest x-ray showing the course of the pacemaker electrode sweeping downwards posteriorly and inferiorly along the left ventricle.

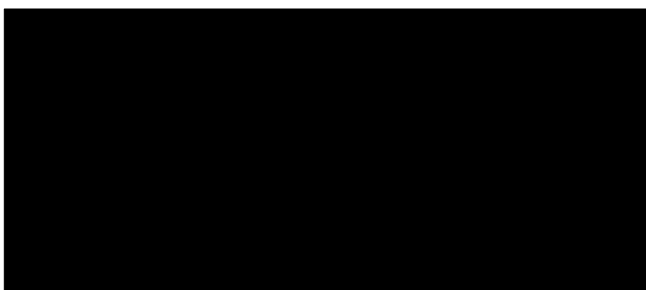


FIGURE 2. Contrast-opacified superior vena cava and coronary sinus. On the left, the pacemaker electrode is shown passing from the brachiocephalic downwards through the persistent left superior vena cava (oblique vein) into the dilated coronary sinus, and sweeping laterally through a branch of the coronary sinus to the apex of the heart. On the right, the pacemaker electrode and the angiographic catheter are shown following the same course through the branch vein.

usually occurs in association with a normal right-sided superior vena cava. However, in rare cases, the right-sided

superior vena cava is atretic.⁶ The presence of this anomaly would normally make it difficult to position the lead in the apex of the right ventricle, in addition to the potential risk of thrombosis of PLSVC or coronary sinus. It has been reported that shaping the lead into a pigtail could help the proper positioning of the lead into the right ventricle.⁷ Repeated trials failed to achieve this goal in our patient.

Since the insertion of the pacemaker 24 months ago, our patient has had no obvious side effects and the pacemaker has been functioning normally. To our knowledge, this is the first reported case of long-term pacing of the heart via a tributary of the coronary sinus. This may be an option available when facing difficulty during the insertion of a pacemaker via an accidentally discovered PLSVC. The situation, though not ideal, is functional and has served our patient well.

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