LETTER TO THE EDITOR

Difficult pacemaker implantation. Detection of a wrong course due to sinus venosus type atrial septal defect

We present an important cause of wrong pacemaker lead placement in the left ventricle due to atrial septal defect. Early recognition of this error is important to prevent thromboembolic complications. A 62-year-old woman with no history of cardiac disease presented with a chief complaint of dizziness and pre-syncope. During her hospital admission, a long sinus pause of over 3 sec was recorded. On her cardiac exam, the patient had a systolic flow murmur. She was diagnosed with sick sinus syndrome initially treated with a temporary pacemaker lead insertion. Her coronary angiography was unremarkable. She was referred for permanent pacemaker (PPM) insertion. During the procedure, fluoroscopy in the left anterior oblique (LAO) projection showed that the permanent lead was imbedded posterior to the temporary pacing lead (Fig. 1a). In the right anterior oblique (RAO) projection, two different sites of implantation suspicious of permanent lead placement into the left ventricle were seen (Fig. 1b). Transesophageal bicaval view showed abnormal pulmonary venous connection to the right atrium (Fig. 1c). Transesophageal echocardiogram showing superior vena cava type atrial septal defect.

Fig. 1  (a) Left anterior oblique (LAO) projection showed a permanent lead imbedded posterior to the temporary pacing lead. (b) Right anterior oblique (RAO) projection confirmed two different sites of implantation suspicious of permanent lead placement into the left ventricle. (c) Transesophageal bicaval view showed abnormal pulmonary venous connection to the right atrium. (d) Transesophageal echocardiogram showing superior vena cava type atrial septal defect.
implantation were observed suspicious for left ventricular lead placement (Fig. 1b). The temporary pacing lead was in its proper position at the right ventricular (RV) apex. Oxygen saturation at the tip of the lead confirmed arterial saturation. Pressure measurement was also consistent with left ventricular pressure (140/8 mmHg). Atrial septal defect (ASD) was suspected. The permanent lead was repositioned following the temporary lead into the RV apex with acceptable thresholds. The temporary lead was removed. Transthoracic and transesophageal echocardiograms showed a large sinus venosus ASD (1.9 cm, Fig. 1c), patent foramen ovale and anomalous connection of the right upper and lower pulmonary veins (Fig. 1d) with a significant left-to-right shunt (pulmonary-to-systemic blood flow ratio: Qp/Qs = 2.4). The patient refused surgical repair. Sinus venosus ASD is the least prevalent ASD occurring at the cardiac junction of the superior vena cava, giving rise to a superior vena cava (SVC) connected to both atria, and is almost always associated with anomalous pulmonary venous connection (Webb and Gatzoulis 2006). Partial anomalous pulmonary venous connection (PAPVC) is a rare congenital cardiac defect. Up to 85% of patients with superior sinus venosus atrial defect have anomalous right pulmonary venous drainage (Gustafson et al. 1989). The most common type of partial anomalous pulmonary venous connection is a right upper pulmonary vein connection to the superior vena cava or to the superior caval atrial junction. This corresponds to the anomalous connection associated with sinus venosus type ASD. It can occur up to 49% of patients with partial anomalous pulmonary venous connection Ammansh et al. (1997) Transthoracic echocardiography is considered to be the gold standard for the diagnosis of sinus venosus type ASD and its associated anomalies in adults Li et al. (1998). Correct positioning of a pacemaker lead in RV can be difficult in patients with sinus venosus ASD. The impact of anomalous pulmonary venous connection on the pacemaker lead placement is not known. It is conceivable that anomalous pulmonary vein connection facilitated correct positioning of the pacemaker lead in the RV. The present case emphasizes the importance of recognizing congenital heart defect in adults which could interfere with cardiac procedures.

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REFERENCES


