

Cardiac pacing in a patient with mechanical tricuspid valve

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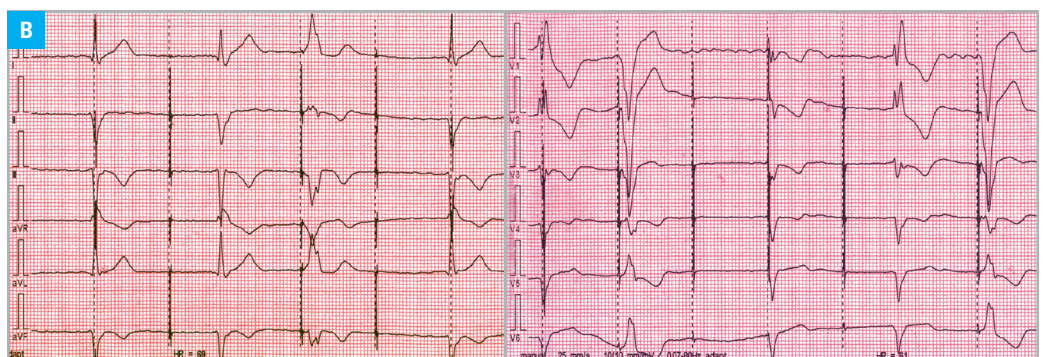
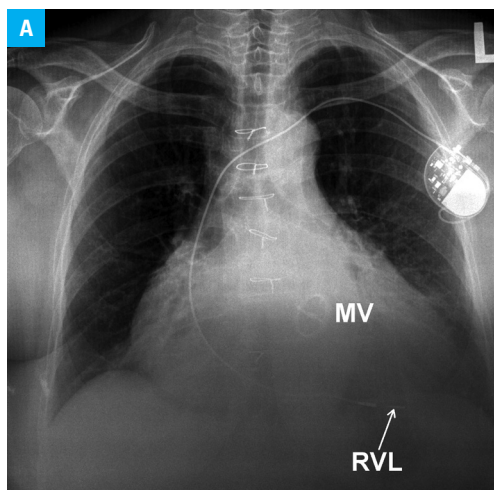
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We report a case of a 71-year-old female patient who underwent the implantation of prosthetic mitral valve 25 years earlier (Medtronic Hall 29M, Medtronic, Minneapolis, United States) owing to severe mitral stenosis and regurgitation. Eleven years earlier, she underwent the implantation of a VVI type pacemaker because of paroxysmal second-degree atrioventricular block with syncope (FIGURE 1A).

Recently, because of enormous tricuspid valve widening, which caused no valve leaflets

coaptation, the patient was scheduled for tricuspid valve annuloplasty with concurrent implantation of an epicardial ventricular lead and pacemaker. The operation was preceded by the transvenous extraction of the old ventricular lead. Due to advanced tricuspid valve lesions, a decision was made during surgery to perform artificial tricuspid valve implantation (Medtronic ATS 33 mm). Simultaneously, the pacing system with an epicardial ventricular lead (Medtronic sutureless unipolar screw-in pacing lead 5071) was implanted and the pacemaker was located in the abdominal wall.

About 7 months later, increasing pacing thresholds and a decrease in the R-wave amplitude, as well as pacing abnormalities on electrocardiography were observed (FIGURE 1B). Therefore, the patient was scheduled for transvenous pacemaker lead implantation through the coronary sinus. A left ventricular (LV) pacing lead (Medtronic Attain 4296) was implanted with good parameters. The postoperative period was complicated by infective endocarditis caused by methicillin-resistant *Staphylococcus epidermidis*, which required mitral valve replacement (Medtronic ATS 25M). Despite infective endocarditis on the mitral valve, we decided not to perform coronary sinus lead extraction, which was stable even after heart manipulations during cardiac surgery. About 5 months



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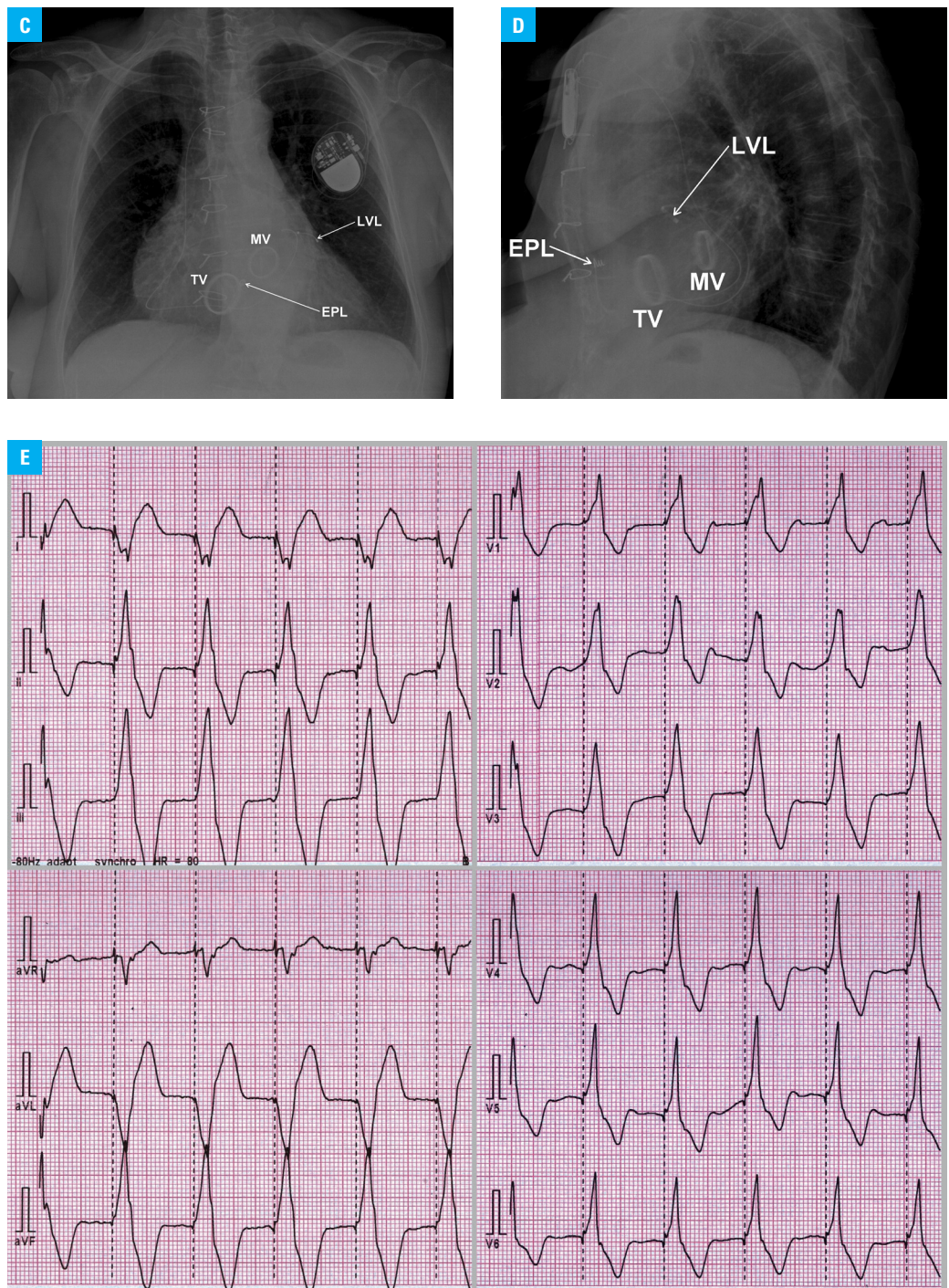


FIGURE 1 **A** – chest X-ray after implantation of mechanical mitral valve (MV, Medtronic-Hall 29M) and a VVI cardiac pacemaker before transvenous lead extraction and implantation of prosthetic tricuspid valve. Right ventricular lead (RVL) in the right ventricular apex. **B** – electrocardiography showing insufficient cardiac pacing via epicardial lead (VVI lower rate of 75 bpm). Atrial fibrillation, irregular cardiac beats, mean heart rate of 45 bpm (maximal RR interval to 1600 ms). Left axis deviation and right bundle branch block in endogenous beats. Stimulated QRS complex morphology of left bundle branch block. **CD** – posteroanterior (**C**) and left lateral chest X-ray (**D**) after implantation of the left ventricular pacing lead (LVL) through the coronary sinus, and removal of the pacemaker located in the abdominal wall. A visible remaining fragment of the epicardial lead (EPL) after surgical pacemaker and EPL extraction. The presence of artificial mitral (MV) and tricuspid (TV) valves. **E** – electrocardiography showing normal left ventricular pacing via endocardial lead implanted through the coronary sinus (VVI lower rate of 80 bpm). Atrial fibrillation. Regular, paced rhythm, heart rate of 80 bpm. Right axis deviation in paced QRS complexes. QRS morphology of the right bundle branch block.

after the last hospitalization, the patient underwent abdominal pacemaker removal (**FIGURE 1CD**). She currently feels well, and the function of both mechanical valves and the pacing system with an endocavitary lead in the coronary sinus is normal (**FIGURE 1E**).

In patients with mechanical tricuspid valve, transvenous endocardial lead implantation into the right ventricle is contraindicated. In some complex congenital heart diseases, this procedure is even unfeasible. Alternative options include epicardial lead implantation. However, because of

limited stability and increasing pacing thresholds, epicardial leads have been reported to require replacement, as in our case. Therefore, lead(s) implantation through the coronary sinus in invasive bradycardia treatment or in sudden cardiac death prevention is proposed. However, there is no consensus regarding the optimal coronary vein choice for the single lead LV stimulation. There are more and more physicians experienced in the implantation of cardiac resynchronization therapy devices, which requires coronary sinus cannulation. In addition, improved leads for LV stimulation are being invented, and what is more, there are single studies available in the literature reporting successful implantable cardiac defibrillator lead implantation through the coronary sinus.

LV pacing in patients with mechanical tricuspid valve has been reported to be effective and to increase safety and cardiac function. Moreover, it may allow patients to avoid cardiac surgery and may be considered the first-choice therapeutic option in patients with tricuspid valve prosthesis.