Cardiomyopathy related to right ventricular pacing in a patient with congenital complete heart block

P. Przyżycka MD, M.Kałowski MD, P.Jakubowski MD, I.Podłębska MSc, I. Cygonkiewicz MD, PhD, K.Kaczmarek MD, PhD.

Department of Electrocardiology, Medical University of Lodz; Lodz, Poland

Background: A 24-year old patient, with congenital complete atrioventricular block, after implantation of dual-chamber pacemaker (PM) at the age of 11, was sent to our center for system upgrading to cardiac resynchronization therapy (CRT) due to aggravation of heart failure symptoms to III NYHA class. Review of medical charts disclosed that the first symptoms of mild HF developed shortly after PM re-implantation. Echocardiography performed at admission revealed severely reduced left ventricle ejection fraction (LVEF) of 23% (Fig.1).

The pacemaker was found to be programmed in DDDR mode (60 bpm), which resulted in 100% ventricular pacing burden (Fig.2). As medical charts indicated that the first pacemaker was programmed at VVI 30bpm back-up mode and signs of HF developed after PM reimplantation which resulted in changing of PM settings into DDDR mode we concluded that right ventricular pacing (RVP) induced cardiomyopathy cannot be excluded.

Since the patient’s escape rhythm with narrow QRS complexes was well tolerated and showed adequate chronotropic competence we decided to evaluate the impact of RVP on LVEF. LVEF evaluated immediately after switching PM to VVI 30bpm back-up mode improved significantly to 31%.

Cardiopulmonary exercise tests performed on both DDDR 60bpm (Fig.3) and VVI 30bpm (Fig.4) also revealed significant superiority of back-up mode (VO2peak=21ml/min vs.26ml/min and METs 10 vs.13.4).

Patient was discharged with PM programmed to VVI 30bpm mode and with optimized pharmacotherapy (initiation of sacubitril/valsartan).

After 3 months of treatment significant improvement in LVEF (55%) (Fig.6) and VO2 peak (28ml/min) was observed. Percentage of ventricular pacing at VVI 30bpm settings was 0,8%. Heart rate was well tolerated by the patient during daily activities (Fig.5, 7).

Discussion: Chronic RVP is well recognized as a factor leading to the decrease of LVEF in some patients. Reduced LVEF at the time of implantation is considered as the main risk factor for potential negative consequences of chronic RVP, however this was not present in our case. In our patient cessation of RVP documented reversible nature of observed cardiomyopathy.