Evaluation of systolic right ventricular function with 3D echocardiography in patients with isolated right ventricular pacing induced left ventricle dysfunction

Authors:
C Jenei¹, R Kadar¹, M Clemens¹, Z Csanadi¹, ¹University of Debrecen, MHSC-Faculty of Medicine, Institute of Cardiology, Department of Cardiology - Debrecen - Hungary,

Topic(s):
3D Echocardiography

Citation:
Background: Right ventricular (RV) pacing may worsen left ventricular (LV) systolic function causing heart failure, but the exact mechanism of the LV dysfunction is unknown. The purpose of this study was to examine the right ventricle by three-dimensional echocardiography in patients with LV dysfunction accompanied by long-term RV pacing.

Methods: We analysed consecutive patients receiving permanent pacemaker (PPM) due to atrioventricular block from 2015 January to 2017 March (n=335). During the mean follow-up period (27 months) 4 patients were selected with at least 5% decrease in the LV ejection fraction measured by two-dimensional echocardiography (B group). Control (K) group contains 4 age-, sex-, concomitant disease matched patients without the sign of LV dysfunction from the same time interval. Right ventricle function was assessed by 3D echocardiography.

Results: In both groups, there were 3 men, and the mean age was similar (B: 68±6 y vs. K: 66±10 y; p=0.65). Right ventricular ejection fraction (EF) was significantly higher in controls compared to patients (K: 49±7.8% vs. B: 36±3.1%; p=0.02), while the right ventricular volumes [end-systolic (K: 79±47 ml vs. B: 71±7 ml; p=0.77), end-diastolic (K: 151±73 ml vs. B: 111±11 ml; p=0.36) and stroke volumes (K: 58±44 ml vs. B: 40±6 ml; p=0.5)] did not differ significantly. We did not find any important differences between the groups regarding the permanent right ventricle pace rate (K: 93±5.6% vs. B: 84±19.5%; p=0.5), systolic pulmonary pressure (K: 34±6 mmHg vs. B: 35±18 mmHg; p=0.92), or the severity of tricuspid regurgitation.

Conclusion: The left ventricular dysfunction after permanent right ventricular pacing results in right ventricular systolic dysfunction. The decrease of RV ejection fraction is not associated with RV enlargement or increase of pulmonary pressure.