First month global longitudinal strain for predicting early pacemaker-induced left ventricular dysfunction (PIVD) six month after pacemaker implantation

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Funding Acknowledgements: None.

Background: Pacemaker-induced ventricular dysfunction (PIVD) and pacemaker-induced cardiomyopathy (PICM) emerged as a complication following right ventricular permanent pacemaker (PPM) implantation, showing a great occurrence in the first year. Finding an early predictor of PIVD and PICM is crucial in order to alleviate mortality, morbidity, and increase health-care cost efficiency.

Purposes: to find new predictor by analyzing effect of first month GLS using 2D-speckle tracking echocardiography and reduction of left ventricular ejection fraction (LVEF), known as PIVD, in the first 6 month after PPM implantation.

Methods: A single center, prospective cohort study was conducted to all patients with normal LVEF, indicated for PPM implantation. Data of GLS was measured before and after one month of PPM implantation. Data of LVEF was measured before and six month after PPM implantation. The change of GLS in one month after PPM implantation was measured as delta GLS, and the change of LVEF in six month was measured as delta EF.

Results: Fifty-three patients from May 2018 until October 2020 was enrolled for this study based on inclusion and exclusion criteria. Patient’s baseline characteristics show 62±14 years of age, most of them had hypertension (54.7%) and had single chamber pacemaker implantation (81.1%). Study analysis reveals that ejection fraction (EF) reduce significantly after six months pacemaker implantation (66.5±5.6% become 60.7±10.7%; p<0.00001). There were 6 patients (11.3 %) suffering PICM. Correlation analysis between the change of GLS in the first month and the change of LVEF in the first six months after PPM implantation was statistically significant with moderate correlation (p<0.00001; r=-0.486). Linear regression analysis shows that every 1 point decrease of first month GLS, affecting 1.83 point decrease of sixth month LVEF (b=-0.1837, p<0.00001).

Conclusion: There is significant moderate correlation between the change of GLS in the first month and early reduction of LVEF in the first 6 months after PPM implantation.

The Scheme of Research Sampling Method