

Value of pulse transit time changes and pulse transit time index as Cardiac resynchronization therapy(CRT) response in chronic heart failure

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Introduction: Cardiac resynchronization therapy (CRT) is part of the treatment for heart failure (HF). Pulse transit time (PTT) is recommended in predicting the response to treatment. The correlation between blood pressure and PTT in HF patients is dissociated; so it is possible to use PTT index in predicting response to treatment. The aim of current study is to evaluate the role of PTT and PTT index (PTTi) in diagnosing response to CRT treatment in HF patients.

Methods: In this cross-sectional study, 22 patients undergoing CRT were evaluated for response to treatment. Measurement of left ventricle ejection fraction (LVEF), pulmonary artery pressure (PAP), Tricuspid Annular Plane Systolic Excursion (TAPSE), left ventricle end diastolic and end systolic volume (LVESV and LVEDV), PTT, Baroreceptor Sensitivity (BRS), Total Peripheral Resistance (TPR), ECG, dp/dt, pulse wave and blood pressure were done before and 3-6 months after CRT. Also, PTT index was calculated by dividing PTT on systolic blood pressure. Patients with 10% or more reduction in LVESV after three months were considered as responder. The ability of PTT and PTTi in detecting response was evaluated.

Results: Comparing the results before and after intervention, only LVEF, TAPSE, LVEDV, LVESV and PTT were significantly improved after intervention. The only correlation was between PTT changes and LVESV changes. For a cut-off point of 33 millisecond decreases in PTT in detecting the response, sensitivity, specificity, positive and negative predictive value were 62.5%, 33.3%, 71.43% and 25%. Also, considering a cut-off point of 0.09 decrease in PTTi in detecting the response, sensitivity, specificity, positive and negative predictive value were 58.82%, 20%, 71.43% and 12.5%.

Conclusion: PTT could predict response to treatment, but the efficacy of PTT index could not be proven.

Keywords: Heart failure; Cardiac resynchronization; Response to treatment; Pulse transit time; Pulse transit time index