

Quantitative Assessment of Left Ventricular Myocardial Work in Patients with Different Types of Atrial Fibrillation by Non-invasive Pressure-strain Loop Technique

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Abstract

Objective: This study aimed to analyze myocardial work in patients with atrial fibrillation (AF) using a non-invasive pressure strain loop (PSL) technique to provide a basis for the quantitative assessment of left ventricular (LV) systolic function. **Methods:** LV myocardial work of 107 AF patients and 55 healthy individuals was assessed by the non-invasive PSL and then compared. **Results:** Global longitudinal strain (GLS) in absolute values, global work index (GWI), global constructive work (GCW), and global work efficiency (GWE) were significantly lower in the AF group than control group, whereas peak strain dispersion (PSD) and global wasted work (GWW) were significantly higher ($P < 0.05$). Further subdivision according to the AF type revealed that, compared with the controls, GLS in absolute values and GWE decreased significantly; PSD and GWW increased significantly in the paroxysmal AF group ($P < 0.05$). Compared to paroxysmal AF, persistent AF induced a further decrease in absolute GLS and GWE and a further increase in GWW ($P < 0.05$). Multiple linear regression analysis showed that GWI and GCW were associated with systolic blood pressure. GWW was associated with types of AF and left atrial volume index (LAVI). GWE was correlated with age, types of AF, disease duration, and LAVI. Receiver operating characteristic curve analysis showed that the area under the curve predicting myocardial injury was higher for GWE and GWW than for GLS. **Conclusions:** Non-invasive PSL can quantitatively assess LV systolic function in patients with different kinds of AF and detect early subclinical myocardial injury in patients with paroxysmal AF. Systolic blood pressure, type of AF, LAVI, disease duration, and age may be associated with myocardial injury in patients with AF.

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