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Synchrony between the right and left heart systems is recovered after TAVI in patients with severe aortic stenosis

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Background / Introduction

Evidences have shown that cardiac function decline and systolic phase change are caused by massive afterload of the stenosed aortic valve in patients with severe aortic valve stenosis. As a result of the reduction of the left ventricular afterload by valve replacement, the cardiac function recovers. However, it has not been clarified yet how the changes in cardiac function affect the relationship between the right and left heart systems, as well as the systole phase.

TAPSE and MAPSE are known as indices of simple cardiac function evaluation by measuring the movement distance of the atrioventricular annulus. We obtained these indices (i.e. TAPSE, MAPSE) within the same heartbeat using speckle tracking analysis of the atrioventricular annulus and evaluated the changes in cardiac function and phase between the right and left heart systems.

Purpose

To reveal the relationship of cardiac function and time phase between the right and left heart systems by evaluating the maximum movement distance and time of the atrioventricular annulus within the same heartbeat and the same view in patients with severe aortic valve stenosis before and after TAVI.

Methods

A prospective cohort study was conducted. We recruited and analyzed 44 patients with severe aortic valve stenosis who received TAVI treatment, able to record baseline before treatment and follow-up 6 months and 12 months after treatment at our hospital from March 2017 to May 2019. Patients were excluded if more than 2 degree of atrioventricular valve regurgitation or incomplete data. The apical four-chamber view was used for speckle tracking analysis with the origin of the apical extension and region of interest (ROI) of the mitral annulus and tricuspid annulus. For each patient before treatment, at 6 months and 12 months after treatment, the maximum contraction distance (DM), maximum contraction time (TM) of the mitral valve annulus, maximum contraction distance (DT) and maximum contraction time (TT) of the tricuspid annulus were measured. Maximum contraction distance ratio (DM/DT) and maximum contraction time ratio (TM/TT) were calculated. For statistical analysis, t-test and ANOVA were used, and a significance threshold of $p < 0.05$ was applied.

Results

TM/TT decreased at 12 months after TAVI, and DM/DT increased significantly at 6 months and 12 months after TAVI when compared to baseline before treatment.

Conclusions: In patients with severe aortic valve stenosis, the correction of cardiac function difference between the right and left heart systems occurs from 6 months after TAVI. Moreover, the correction of contraction phase difference between the right and left heart systems at 12 months after TAVI. Thus, the synchrony between the right and left heart system is recovered 12 months after TAVI.

Abstract P662 Figure.

