

GW23-e1306

THE PRELIMINARY STUDY OF EVALUATION OF LEFT VENTRICULAR BULK ROTATION AND UNTWISTING IN HEART TRANSPLANT PATIENTS AT POSTOPERATIVE 3 MONTHS BY TWO-DIMENSIONAL ULTRASOUND SPECKLE TRACKING IMAGING

doi:10.1136/heartjnl-2012-302920ad.41

Jun You, Mingxing Xie. *Department of Ultrasonography, Union Hospital of Tongji Medical College, Huazhong University of Science and Technology, Wuhan 430022, China*

Objectives To evaluate the change of left ventricular bulk rotation and untwisting in heart transplant patients at postoperative 3 months by two-dimensional ultrasound speckle tracking imaging (STI).

Methods There were 15 heart transplant patients without clinical rejection (11 male, 4 female, age range: 14~58 years, mean age: 41.7 ± 14.5 years) who were at postoperative 3 months with medically controlled blood pressure showing $<140/80$ mm Hg. Two LV short-axis images at the basal and apical level were acquired in the 15 heart transplant patients and 56 healthy subjects (32 male, 24 female, age range: 15~63 years, mean age: 38.7 ± 11.4 years). The data depicting the basal and apical LV rotation versus time profiles were acquired by STI software. LV bulk rotation at the time of aortic valve closure and the time of mitral valve opening, the peak degrees of LV bulk rotation and untwisting rate in diastole were measured.

Results

1. 14 patients were preoperatively diagnosed as dilated cardiomyopathy, and 1 patient was diagnosed as restrictive cardiomyopathy. Mean preoperative left ventricular ejection fraction of receptors, mean donor's age, mean donor's weight, mean extracorporeal circulation time, mean aortic cross-clamping time,

mean cold ischaemia time and mean warm ischaemia time were (26.5±5.6)%, (34.0±6.1) years, (63.3±6.3) kg, (111.9±10.0) min, (49.1±10.4) min, (186.0±100.4) min, (261.7±44.7) s, respectively.

2. Significant increases in heart rate, the inside diameters of left atrium, right atrium and right ventricle, the thickness of inter-ventricular septum and left ventricular posterior wall, isovolumic relaxation time and E/e ratio, and significant decreases in e value and a value were obtained in the heart transplant group, compared with the normal control group ($p<0.05$). There were no significant differences in age, gender, height, weight, body mass index, left ventricular end-diastolic volume, left ventricular end-systolic volume, left ventricular end-diastolic inside diameter, left ventricular end-systolic inside diameter, left ventricular ejection fraction, E value, A value, E/A ratio, e/a ratio between the two groups ($p>0.05$).
3. There were no differences in the direction and degrees of left ventricular bulk rotations. As viewed from the apex, the LV performed a counterclockwise wring motion with a clockwise rotation at the base and counterclockwise rotation at the apex in systole in both groups, and performed a clockwise untwisting motion with a counterclockwise untwisting at the base and clockwise untwisting at the apex in diastole in both groups. There were no significant differences in the degrees of LV bulk rotation at the time of aortic valve closure and the time of mitral valve opening, and the peak degrees of LV bulk rotation between the two groups ($p=0.884$, $p=0.460$, $p=0.704$, respectively). Systolic rotation reached its peak value at end-systole in both groups (heart transplant group $96.1\pm 8.4\%$ vs the normal control group $100.5\pm 6.3\%$, $p=0.065$, where 0~100% was systolic duration and 100~200% was diastolic duration).
4. Significant decreases in untwisting rate and trend untwisting variables (untwisting at $t=5, 10, 15, 20, 25$, and 30% in diastole) were obtained in the heart transplant group, compared with the normal control group ($p<0.01$). No statistically significant correlations between untwisting variables and preoperative left ventricular ejection fraction of receptor, extracorporeal circulation time, aortic cross-clamping time, cold ischaemia time and warm ischaemia time were found ($p>0.05$).

Conclusions There were no significant differences in the direction and degrees of left ventricular bulk rotations and the time when systolic rotation reached its peak value between the heart transplant group and the normal control group. That was, the systolic function of cardiac allografts was normal at postoperative 3 months. Significant decreases in untwisting rate and trend untwisting variables in the heart transplant group showed that the diastolic function of cardiac allografts was impaired at postoperative 3 months.