Echocardiography: Valve Disease

Dynamics of right ventricle contractility after cardiac surgery of tricuspid valve

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Background: The function of right ventricle (RV) is an independent prognostic factor for patients with valvular heart disease. However, changes in RV function parameters in patients with and without tricuspid valve operations after cardiac surgery are lack known. The aim of the study was to define changes in RV parameters after cardiac surgery in patients with left-sided valve diseases.

Methods: Fifty-five consecutive patients (33 men, 61 ± 10 years old), who were referred for the repair and/or replacement of left-sided valves, were included in the study. A transthoracic echocardiography assessment before and an average of 109 days (91-114) following the operation was performed. Tricuspid annular plane systolic excursion (TAPSE), fractional area change RV (FAC), strain of the RV free wall (SRV), and right atrial volume were assessed in groups of patients with and without tricuspid valve repair.

Results: Valve repair for secondary tricuspid regurgitation was performed in nineteen patients undergoing left-sided valve surgery. Thirty-six patients had repair and/or replacement of left-sided valves without a tricuspid valve operation. There was a strong correlation between TAPSE, FAC, and RV strain before the operation ($R = 0.62\text{-}0.77$, $p < 0.000002$). However, there was no correlation between TAPSE and FAC; TAPSE and RV strain after the operation. TAPSE and RV strain significantly decreased after the operations and were below the normal range in both the groups of patients with and without tricuspid valve repair. TAPSE was 21 ± 5mm before the operation vs. 14 ± 4 mm after operation, $p < 0.0000001$ for all patients (20 ± 5mm vs. 13 ± 3 mm, $p < 0.0003$ for the group which underwent tricuspid valve repair; 22 ± 4mm vs. 14 ± 4 mm, $p < 0.000001$ for tricuspid valves which were not operated on). RV strain was -19 ± 6 mm before operating vs. -16 ± 5mm after operating, $p < 0.0004$ for all patients (-20 ± 6mm vs. -15 ± 5mm, $p < 0.006$ for tricuspid valve repair; -19 ± 6mm vs. -16 ± 4 mm, $p < 0.02$ for the tricuspid valves which were not operated on). There was no difference in TAPSE and SRV among patients with and without tricuspid valve repair. Decreased longitudinal function parameters (TAPSE and SRV) didn't correlate with patients' clinical status or with normalized right chambers volumes. FAC was 39 ± 11% before operating vs. 41 ± 9% after the operation, $p = 0.45$ for all patients (37 ± 13% vs. 40 ± 8%, $p = 0.69$ for the group which underwent tricuspid valve repair; 40 ± 10% vs. 41 ± 9%, $p = 0.52$ for the group with tricuspid valves which were not operated on). An increase in FAC correlated with a decrease in right chamber sizes after operations ($R=-0.37$, $p < 0.03$).

Conclusion: Longitudinal right ventricle parameters (TAPSE, SRV) significantly decrease after valve operations in groups with and without tricuspid valve repair. However, there is no correlation with the clinical status of patients. Global function parameters (FAC) correlates with the normalization of right chamber size after cardiac operation.