

Impact of pulmonary artery banding on the common atrioventricular valve in complete atrioventricular septal defect

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Objective: The impact of pulmonary artery banding (PAB)-induced changes in hemodynamics on the common atrioventricular valve (CAVV) have not been elucidated. The purpose of this study was to clarify the impact of PAB on the CAVV in CAVSD.

Methods: The subjects were 24 patients who underwent PAB for CAVSD between 2000 and 2017. We examined changes in CAVV regurgitation (CAVVR) and left atrioventricular valve (LAVV) size growth from before PAB to before intracardiac repair (ICR). The LAVV diameter was measured on echocardiography and expressed as a z-score. The degree of CAVVR was evaluated as follows: none, 0; slight, 0.5°; mild, 1°; moderate: 2°; and severe, 3°.

Results: Leaflet anomaly was present in 4 patients. An analysis was performed for 23 patients with biventricular repair. The median age and body weight at PAB were 6.0 months (0.5–38 months) and 3100 g (1000–4615 g). The median band circumference was body weight (kg) + 17 mm (10–22 mm). The median pressure at PAB was 3.6 m/s (2.2–4.5 m/s). The median PAB-ICR period was 14 months (4–109 months). According to changes in CAVVR, the patients were classified into an exacerbation (n=4) or non-exacerbation group (n=19). In the non-exacerbation group, 15 patients (78%) showed improvement in CAVVR and the mean score before PAB was $1.4 \pm 0.4^\circ$ and that before ICR was $0.6 \pm 0.4^\circ$. A group comparison showed no significant difference except for the leaflet anomaly ($p=0.01$) in all 4 patients in the exacerbation group, whose left atrioventricular valve diameter did not increase (mean z-score before PAB, -0.40 ± 0.48 and before ICR, -0.47 ± 0.22). In the non-exacerbation group, the LAVV diameter increased in 16 patients (84%; mean z-score before PAB, -0.47 ± 0.90 and before ICR, -0.38 ± 0.79). In the multivariate analysis of the LAVV size growth in all 23 patients, significant associations were observed only among leaflet anomaly ($p=0.02$) and CAVVR exacerbation before ICR ($p=0.02$).

Conclusion: The patients without leaflet anomaly showed no CAVVR exacerbation due to the pressure load produced by PAB and showed improvement in CAVVR due to decreased ventricular volume load, suggesting the possibility of growth of the LAVV.