QUANTITATIVE EVALUATION OF VENTRICULAR WORKLOAD IN INFANTS WITH VENTRICULAR SEPTAL DEFECT: ENERGY LOSS ESTIMATION USING ECHOCARDIOGRAPHY VECTOR FLOW MAPPING

Poster Contributions
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Background: In infants with ventricular septal defect (VSD), volume overload based on the left-right shunt has been considered to influence the ventricular workload; however, the extent of the workload has never been evaluated quantitatively. Echocardiography Vector Flow Mapping (VFM) enabled calculation of energy loss (EL), which is considered to be caused by inefficient flow. In the present study, we examined the relationship between ventricular EL and cardiac function parameters, and revealed the impact of volume overload on the ventricle.

Methods: We measured energy loss in the left ventricle using echocardiography VFM in 14 infants with VSD (Figure). We also performed catheterization measuring pulmonary to systemic blood flow ratio (Qp/Qs), pulmonary vascular resistance (Rp), systemic vascular resistance (Rs), pulmonary arterial pressure (PAP), systolic arterial pressure (SAP), and brain natriuretic peptide (BNP).

Results: The peak value of EL in the diastolic phase (ELD) significantly correlated with Qp/Qs, Rp/Rs and PAP/SAP (r = 0.706, 0.712 and 0.846, respectively). ELD also has strong correlation with BNP (r= 0.848). The ELD-BNP curve had an inflection point at 0.6mW/m², which corresponded to Qp/Qs 1.7.

Conclusions: ELD was considered to be a sensitive parameter which reflects ventricular workload. The ELD-BNP curve indicated the possibility that Qp/Qs 1.7 is the turning point at which ventricular overload drastically increases in infants with VSD.