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Diastolic dysfunction whose etiologies were mostly obscure in Glenn patients frequently causes increased pressure of superior vena cava

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Introduction: It is unknown what factors induce diastolic dysfunction of ventricle (DDSV) in Glenn patients. Furthermore, it is unclear what harms are provoked by DDSV. The purpose of this study was to investigate the related factors to DDSV and the adverse effects by DDSV in Glenn patients.

Methods: The medical records of 146 Glenn patients were reviewed aged from 9 months to 24 years. They underwent cardiac catheterization between 2010 and 2017. We defined DDSV as end-diastolic pressure of ventricle 13 mmHg or over (n=34). First, indexes were determined which were connected with DDSV. Second, we compared pulmonary circulation factors between Glenn patients with and without DDSV.

Results: In univariate analysis DDSV in Glenn patients was associated with expanded ventricular volume on end-systole and on end-diastole, increased ventricular pressure on end-systole. Following factors were not related to DDSV; study ages, 1st strategies, additional flow to pulmonary arteries, strong regurgitation of atrio-ventricular valve, and ventricular ejection fraction. After multivariate analysis, DDSV in Glenn patients was independently associated with odds ratio of 8.1 for ventricular pressure on end-systole (≥ 97 mmHg), and 4.4 for ventricular volume on end-systole ($\geq 66\%$). The explanatory coefficient was low (R-square=0.22). As for pulmonary circulation factors, pressure of pulmonary capillary wedge or left atrium was higher in Glenn patients with DDSV (11.7 vs. 7.6 mmHg; $p<0.0001$); pressure of superior vena cava was higher 16.3 vs. 12.1 mmHg; $p<0.0001$). The ratio of patients with pressure of superior vena cava 16 mmHg or over was more in DDSV patients (48% vs. 14%; $p<0.0001$).

Conclusion: Our study showed that half Glenn patients with DDSV possessed so high pressure of superior vena cava that indicated risk factor for Fontan. Our study also showed DDSV in Glenn patients was connected with ventricular volume on end-systole and on end-diastole, and systolic pressure of ventricle. However, eight out of ten patients did not possess obvious risk factors for DDSV in Glenn circulation. We might tighten medical management for Glenn patients not to fall into DDSV, if we could not catch risk factors.