

Diastolic dysfunction is associated with ventricular types and non-administration of vasodilators in patients before Glenn

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Background: Ventricular diastolic dysfunction (DDSV) blemishes pulmonary circulation quite a bit in Fontan circulation whose pulmonary pressures are consisted of venous pressures. We predicted DDSV would adversely affect pulmonary circulation in patients even before Glenn procedure. We investigated cardio-pulmonary factors related to DDSV in patients before Glenn.

Methods: The medical records of 163 pre-Glenn patients were reviewed who were fewer than 2 years. They underwent cardiac catheterization between 2010 and 2018. We defined DDSV as ventricular diastolic pressures 13 mmHg or over. First, we sought related factors to DDSV in pre-Glenn circulation by mono-variate and multi-variate analysis. Second, we inquired into DDSV impacts on pulmonary circulation.

Results: Four factors were significantly different between pre-Glenn patients with and without DDSV. In binominal logistic analysis DDSV was significantly related to following factors: end-systolic ventricular pressure ≥ 91 mmHg (odds ratio 12.3, 95% C.I.: 2.5- 60.7), aortic systolic pressure ≥ 84 mmHg (OR 3.3, 95% C.I.: 1.2- 9.0), and bi-ventricle/left ventricle dominant (OR 2.6, 95% C.I.: 1.2- 5.4), and non-administration of vasodilator/angiotensin receptor blocker (OR 2.1, 95% C.I.: 1.0 – 4.2). The DDSV was not significantly associated with 1st strategies, ventricular volumes, ventricular ejection fraction, and atrio-ventricular valve regurgitation. Out of 4 significant factors, 3 were independently associated with DDSV, such as high end-systolic pressures of ventricle ($p=0.0030$), non-internal-use ACEI/ARB ($p=0.034$), non-dominant right ventricle ($p=0.019$). With regard to adverse against pulmonary circulation, following levels were higher in pre-Glenn patients with DDSV: wedge pressures of pulmonary vein/pulmonary artery pressures (18.5 vs. 14.8 mmHg: $p<0.0001$); left atrium pressures/wedge pressures of pulmonary artery (8.9 vs. 7.0 mmHg: $p=0.0011$). The frequency of beta blocker were not significantly different between patients with and without DDSV. However, that of pulmonary vasodilators was significantly higher in DDSV group (20% vs. 6%: $p=0.029$).

Conclusion: In pre-Glenn patients DDSV were independently associated with high ventricular end-systolic pressures, non-right-ventricle type, and non-administration of ACEI/ARB. Pre-Glenn patients with DDSV possessed highly elevated pulmonary-artery pressures, which would be impeditive to Glenn circulation. We should employ ACEI/ARB more proactively against pre-Glenn patients to acquire well-established Glenn circulation. Especially ACEI/ARB might combat patients with non-right-ventricle type.