

Fontan children with enalapril have decline of estimated glomerular filtration-rate owing to low blood pressure or combination use of drugs

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Background.

In childhood criterion values of creatinine (Cr) are very different according to ages, which makes difficult for us to evaluate children's renal function by raw Cr values. Fontan patients are often administered angiotensin converting-enzyme inhibitor (ACEI), who sometimes show reduced renal functions. Japan society of pediatric renal failure provides formula of estimated glomerular filtration-rate (eGFR). We assessed reduction of kidney functions by eGFR in Fontan children with ACEI and sought backgrounds of reduced eGFR.

Methods.

The medical records of 139 Fontan children with or without ACEI were reviewed aged from 2 to 18 years. They underwent cardiac catheterization and routine blood tests between 2010 and 2015. We calculated eGFR by pediatric formula which was composed of quintic equation for body height. Patients with eGFR 80 mL/min/m² under (n=27) were defined as decreased eGFR. We compared clinical characteristics between patients with decreased eGFR and non-decreased eGFR.

Results.

There were significant differences in cardiac performances between Fontan patients with decreased eGFR and without decreased eGFR, such as ventricular volume on end-diastole and end-systole, and ventricular pressure on end-systole. However, significant area under a receiving operating characteristics curve for predicting decreased eGFR was gained only by end-systolic ventricular pressure (0.328, 95% CI=0.212-0.443; p=0.005). Contrary to expectance, following performances were not different between two groups; ventricular pressure on end-diastole, ventricular ejection fraction, central venous pressure, and cardiac output. Clinical backgrounds were also not different between two groups. As for medicine, the rate of decreased eGFR was significantly higher in ACEI group with high dose, in ACEI group with angiotensin receptor blocker, and in ACEI group with spironolactone. After multivariate analysis, decreased eGFR was independently associated with combined usage of ACEI or angiotensin receptor blocker (odds ratio 6.4, p=0.009), and low ventricular pressure on end-systole (≤ 71 mmHg: odds ratio 3.6, p=0.018).

Conclusion.

We could estimate renal function in Fontan children by eGFR formula for Japanese. Fontan children with ACEI should take care of reduced renal function, if they took angiotensin receptor blocker or spironolactone. We also should mind low blood pressure in Fontan patients with ACEI to check up kidney function.