

High-dose administration of beta-adrenergic blocking agent does not cause reverse modeling for systemic ventricle in Fontan children

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Background.

Concerning heart failure therapy against bi-ventricle beta-adrenergic blocking agent (beta-blocker) produces reverse modeling, such as a dose-related decrease in systemic ventricular size and a dose-related increase in ejection fraction. In beta-blocker therapy we should raise amount of drugs carefully. There are no reports about high-dose administration of beta-blocker to systemic ventricle in Fontan children. We estimated cardiac function in Fontan children who were administered high-dose beta-blocker.

Methods.

The medical records of 176 Fontan children were reviewed aged from 2 to 14 years. They underwent cardiac catheterization between 2010 and 2016. We divided the whole into 4 groups: 25 with beta-blocker 0.6mg/kg or over (High beta-blocker), 39 with beta-blocker between 0.30 and 0.59 mg/kg (Middle beta-blocker), 29 with beta-blocker 0.29mg/kg or under (Low beta-blocker), and 83 without beta-blocker (No beta-blocker). We compared cardiac performances among 4 groups.

Results.

End-diastolic ventricular volume was significantly larger in High beta-blocker than that in each other group, such as Middle beta-blocker, Low beta-blocker, and No beta-blocker (174%, 117%, 111%, 100%). However, it was not significantly different among these 3 groups other than High beta-blocker. Similarly, end-systolic volume was significantly larger in High beta-blocker than in each other group (86%, 55%, 43%, 45%), which was not significantly different among 3 groups. Ejection fraction of ventricle was also lower in High beta-blocker (47%, 55%, 57%, 55%), which was not different among 3 groups; value of NT-pro BNP (pg/ml) was significantly higher in a like manner (1711, 280, 293, 155). The rate of patients was not significantly different among 3 beta-blocker groups (High, Middle, Low) who underwent catheterization for the purpose of other than periodic examination, such as suspicion of cardiac dysfunction and catheter intervention (48%, 46%, 44%, 15%) .

Conclusion.

For these Fontan children we could not obtain the results that high-dose beta-blocker provoked reverse modeling, such as reducing ventricular volume and improving ventricular ejection fraction. We gained the results that cardiac functions in High beta-blocker were inferior to those in other lower beta-blocker or no beta-blocker groups. We should support Fontan children with high-dose beta-blocker carefully to make sure whether cardiac functions improve.