

Upper limit of end-diastolic ventricular pressure is very low in Fontan patients which is set by decreased liver function

Hamamichi Y., Takeguchi M., Horimoto Y., Mastui T., Saito M., Ishii T., Inage A., Ueda T., Yazaki S., Yoshikawa T.

Sakakibara Heart Institut, Tokyo, Japan

Background.

The upper limit of end-diastolic pressure (EDP) of systemic ventricle is said to be approximately 12 mmHg in normal heart. If EDP of systemic ventricle is held in this range, hepatic damage is never provoked by EDP in bi-ventricular heart. In Fontan patients without right-sided ventricle, however, they have the potential to suffer liver disturbance induced by this limit value. We attempt to estimate safety margin of systemic ventricular EDP set by decreased liver function in Fontan patients.

Methods.

The medical records of 174 Fontan patients were reviewed from 1 year to 42 years. They underwent cardiac catheterization and routine blood test between 2010 and 2015. Four laboratory data, such as total protein (TP), albumin (Alb), total bilirubin (T-bil), and platelet (Plt), were employed as indexes for liver impairment. We adopted EDP as state variable and 4 hepatic-function data as assay variables.

We examined whether the area under a receiving operating characteristics curve (AUROC) was calculated to determine the best discriminating each liver-function factor for predicting abnormal EDP.

Results.

We gained significant AUROC for predicting EDP \geq 13 mmHg (n=16) by 3 hepatic-function indexes such as Alb (0.336, p=0.331), TP (0.300, p=0.008), and Plt (0.329, p=0.025). Similarly, we gained significant AUROC for predicting EDP \geq 12 mmHg (n=26) by all indexes, and EDP \geq 11 mmHg by 3 indexes (Alb, T-bil, Plt). Only by Plt we obtained significant AUROC for predicting EDP \geq 10 mmHg (n=60), EDP \geq 9 mmHg (n=85), and EDP \geq 8 mmHg (n=98). Significant AUROC were not acquired for predicting EDP 7 mmHg or below by any of 4 indexes.

Conclusion.

We judged upper limit of EDP was 10 mmHg at a maximum in Fontan patients which was estimated by hepatic disorder. If we adopted only Plt counts as index which indicated liver abnormality, safety margin of EDP went down to 7 mmHg from 10 mmHg. If it was, more than half of Fontan patients in this study would have the potential to suffer liver damage by increased EDP. We might lower EDP drastically to avoid liver impairment in Fontan patients.