QRS-T angle predicts the ventricular dysfunction in Fontan patients

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Introduction: Patients with functional single ventricle have a risk of ventricular dysfunction. A wide range of electrophysiological abnormalities tend to develop years after Fontan procedure. The spatial QRS-T angle, defined as the angle between the directions of ventricular depolarization and repolarization in 3-dimensional space, has been found associated with sudden cardiac death and other cardiac risks in multiple observational studies. The aim of this study was to validate the prognostic value of computer-derived measurements of the spatial QRS-T angle from the standard 12-lead ECG in single ventricle after Fontan procedure.

Methods: A total of 74 patients with functional single ventricle who underwent Fontan procedure were analyzed retrospectively. The independent measurements of the ECG variables including QRS-T angle in the 12-leads were undertaken using the Infinitt recording system. We categorized the study patients according their ventricular function as either the normal group (n=63) or ventricular dysfunction group (n=11).

Result: In our analysis of ECG parameters, the spatial QRS-T angle (80.09 ± 42.43 vs. 43.56 ± 30.49 ms, P =0.032) and QRS wave dispersion (19.4 ± 5.7ms vs. 5.6 ± 2.9 ms, P < 0.001) were significantly increased in the ventricular dysfunction group. However, spatial QRS –T angle was not significantly related to the risk of atrial tachycardia in the Fontan procedure.

Conclusion: In our analysis of ECG parameters, the spatial QRS-T angle (80.09 ± 42.43 vs. 43.56 ± 30.49 ms, P =0.032) and QRS wave dispersion (19.4 ± 5.7ms vs. 5.6 ± 2.9 ms, P < 0.001) were significantly increased in the ventricular dysfunction group. However, spatial QRS –T angle was not significantly related to the risk of atrial tachycardia in the Fontan procedure.