

Functional capacity in children with Fontan physiology: cardiopulmonary exercise test and echocardiographic parameters.

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Cardiopulmonary Exercise Test (CPET) is an essential tool for characterization, prognosis, and response to treatment in children with cavopulmonary physiology (CP-P). Functional capacity decreases with age and the premature detection of impairment is a matter of concern.

This research aimed to describe the functional capacity in children with Fontan physiology, controlled between 2014 and 2017, comparing it with echocardiographic systolic function parameters.

Methods: We reviewed clinical records, echocardiographic and CPET data of 46 children aged 8 - 18 with single ventricle (SV) palliated with Fontan procedure. We described anthropometric measures and physical capacity outcomes. Echocardiographic parameters of ventricular function were differentiated by ventricular morphologies: SV with left morphology (SV-L), SV with right morphology (SV-R), univentricular palliation in biventricular patients named biventricular group (BI-V).

Results: 65% boys; mean age 13.6 ± 2.5 years; mean Body Mass Index Z-Score $+ 0,3 \pm 1$. 29 (64.45%) SV-L, 9 (20%) SV-R and 7 (15.55%) BI-V.

Average $\dot{V}O_2$ peak was $27,3 \pm 10,98$ ml/Kg/min. Peak Heart Rate was 143 ± 63 bpm, 71 % of the expected HR. Peak Respiratory rate was 45 ± 19 bpm, 103% of the expected RR. When analyzing quartiles for $\dot{V}O_2$ peak, 25% of patients presented values ≤ 23.5 ml/kg/min, which correspond to functional capacity II or lower (NYHA).

Echocardiographic parameters of SV-L patients: 25/29 had EF by Teicholz, 22 (88%) $\geq 55\%$ and 3 (12%) between 54-45%. 19/29 had biplane EF: 16 (84%) had EF $\geq 55\%$ and 3 (16%) between 54-45%. SV-R group: 7/9 were evaluated by FAC, 6 (85.7%) had FAC ≥ 0.33 and 1 (14%) had systolic dysfunction. BI-V patients: 5/7 were evaluated by Teicholz, 3 (60%) had EF $\geq 55\%$, 1 (20%) between 54-45% and 1 (20%) between 45-30%.

In patients with $\dot{V}O_2$ less than 24ml/kg/minute no statistically significant relationship was found between low $\dot{V}O_2$ and systolic or diastolic dysfunction.

Conclusion: 25% of Our cohort of patients with Cavopulmonary physiology showed significantly low $\dot{V}O_2$ /Kg values. Classic echocardiographic parameters did not correlate with these functional alterations. CPET is recommended in the routine control of this patients to have a more reliable assessment of their functional capacity.