Maximum oxygen uptake in children with congenital heart diseases: a multicenter comparative study

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Background: Cardiopulmonary exercise test (CPET) is recommended in the follow-up of adults with congenital heart diseases (CHD) but not yet in CHD children.

Objectives: We aimed to compare the maximum oxygen uptake (VO2_max) of a large cohort of CHD children to that of a control population. We also intended to identify clinical characteristics that most impacted VO2_max in this population.

Methods: From 2010 to 2015, we included healthy and CHD children who performed a complete CPET. Children with no chronic disease, no treatment and normal physical examination were included in the control group. The impact of clinical characteristics on VO2_max was studied with multivariate analysis.

Results: 798 children (496 CHD and 302 controls) were included. Mean VO2_max in the CHD group and control represented respectively 93±20% and 107±17% of predicted values. VO2max was significantly lower in the CHD group, overall (37.8±0.3 vs 42.6±0.4 ml/kg/min, p<0.0001) and for each group (p<0.05). Mean VO2max decline per year was significantly higher in CHD than in controls overall (-0.85±0.10 vs -0.34±0.17 ml/kg/min/year, p<0.01), for males (-0.72±0.14 vs 0.11±0.19 ml/kg/min/year, p<0.01) and for females (-1.00±0.13 vs -0.55±0.21 ml/kg/min/year, p<0.05).

Conclusion: VO2_max among children with CHD, as opposed to adults, was weakly altered but remained significantly lower than normal children. We recommend performing CPET in routine follow-up of these patients. We should now focus on pediatric cardiac rehabilitation among selected CHD children.