Correlation between cardio-pulmonary exercise test variables and health-related quality of life among children with congenital heart diseases

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Background peak oxygen uptake (VO2) correlates with health related quality of life (QoL) in adults with heart failure. Cardio-pulmonary exercise test (CPET) is recommended in the follow-up of adults with congenital heart diseases (CHD). Few data is available as regards correlation between CPET and QoL among children with CHD.

Methods and results 202 CHD children aged 8 to 18 performed a CPET (treadmill n=96, cycle-ergometer n=106). CHD severity was stratified into 4 groups. All children and parents filled out the KischQoL questionnaire. Peak VO2, anaerobic threshold (AT), oxygen pulse followed a downward significant trend with increasing CHD severity and conversely for VE/VO2 slope. Self-reported and parent-reported physical well-being QoL scores correlated with peak VO2 (respectively r=0.27, p<0.001 and r=0.43, p<0.001), percentage of predicted peak VO2 (r=0.28, p<0.001 and r=0.41, p<0.001), and percentage of predicted VO2 at AT (r=0.22, p<0.01 and r=0.31, p<0.001). Significant correlations were also observed between several QoL dimensions and VD/VT ratio, oxygen uptake efficiency slope (OUES), oxygen pulse but never with VE/VO2 slope. The strongest correlations were observed in the treadmill group, especially between peak VO2 and physical well-being for parents (r=0.57, p<0.001) and self (r=0.40, p<0.001) reported QoL..

Conclusions peak VO2 and anaerobic threshold are the two CPET variables which best correlated with self and parents-reported QoL in this large pediatric cohort. If QoL is involved as a “patient related outcome” in a clinical trial in pediatric cardiology, we suggest to use parents related QoL scores.

Clinical Trial Registration ClinicalTrials.gov (number NCT01202916).

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Prognostic value of invasive hemodynamic parameters in Eisenmenger syndrome

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Introduction Usefulness of cardiac catheterization in Eisenmenger syndrome is controversial. We investigated the prognostic value of invasive hemodynamic parameters.

Methods 69 consecutive patients with congenital heart disease and pulmonary vascular resistance (PVR)>8UW.m² (Eisenmenger syndrome, n=63; non-correctable left-to-right shunt, n=6), with at least 1 catheterization after 1994, were included. Pulmonary artery pressures (PAP) and oxygen (O2) consumption were measured using the same standardized method. PVR were calculated using the Fick principle. Outcome was assessed in 2015 and survival analysis was performed.

Results Mean age at first catheterization with this protocol was 38±13.3 y.o.. Pre-tricuspid, post-tricuspid and combined shunts were observed in 44 (63.8%), 23 (33.3%) and 2 (2.9%) cases. Patients were free of any pulmonary anti-hypertensive drugs in 54 (78.3%) cases. A Who status 3 or 4 was observed in 37 patients (53.6%). Median PVR and diastolic PAP were 24.6 [19.2-37.6] UW.m² and 40.0mmHg [34.5-50]. There was no complication. During a median follow-up of 7.2 y. [5.2-11.6], 23 (33.3%) patients reached a composite outcome criteria (death n=12; heart-lung transplantation n=6; transplant listing n=5). Outcome was associated with pulmonary O2 saturation (<70% (p=0.01), aortic O2 sat, ≤88% (p=0.02), mixed venous blood O2 sat, ≤65% (p=0.01), PVR ≥30UW.m² (p=0.02), diastolic PAP ≥155mmHg (p=0.01) and who 3-4 (p=0.01). After adjustment for the position of the shunt and the number of anti-hypertensive drugs, diastolic PAP≥155mmHg and Who 3-4 remained associated with outcome in Cox regression analysis (HR 5.6, p=0.006; HR=5.3, p=0.008). There were trends that did not reach significance for the other hemodynamic parameters.

Conclusion In addition to functional status, first catheterization provides prognostic information in patients with Eisenmenger syndrome. If these information could improve the therapeutic algorithm remains to be demonstrated (figure next page).

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