Assessment of CPET in Patients with an Atrial Switch

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Background: Patients with d-transposition of the great arteries (TGA) and an atrial switch repair are at risk of progressive decline in systemic ventricular function resulting in heart failure (HF), transplant (HT) or death. Exercise testing (CPET) has been used to assess clinical decline, however, results are conflicting. Lack of correlation may relate to use of single exercise parameters, namely, peak oxygen consumption (VO2). We sought to assess the clinical utility of CPET in a cohort of these patients undergoing longitudinal CPET over a 15 year period.

Methodology: Retrospective review of CPET studies was performed with calculation of VE/VCO2, oxygen uptake kinetics (OUES) and VO2, in addition to standard measures. Presence of adverse outcome (ADV) was noted and included hospitalization for HF, HT or death. Exercise variables were compared for groups and timing of attainment of traditional HT criteria including VO2<14 ml/kg/min or VE/VCO2>34, in addition to previously published optimal prognostic cut-off value of OUES<1470 ml/min were noted.

Results: 47 CPET were performed in 28 patients with patients undergoing 1-3 tests. ADV occurred in 10(22%) patients. When comparing those with vs without ADV, there was as significant difference in max VO2 (17.8+/-4.9 vs 24.25+/-5.7;p=0.002), OUES (1372+/-446 vs 1976+/-433; p<0.001), VE/VCO2 slope to AT (34+/-15 vs 25+/-5.3; p=0.003), and VE/VCO2 slope total (43.3+/-24.5 vs 32.3+/-5.5; p=0.017). Of those with ADV, 27% had VO2 < 14 ml/kg/min (vs 3% without; p=0.011), 36% had VE/VCO2 > 34 (vs 3% without; p=0.002) and 66% had OUES <1470 ml/min (vs 8% without; p=<0.001).

Conclusions: Serial CPET in at risk cardiac populations is valuable. OUES in addition to VE/VCO2 >34 and VO2< 14 and may signal at risk atrial switch patients in need of careful monitoring.