

MP1-3

Cardiopulmonary exercise test (CPET) and dobutamine stress cardiac magnetic resonance imaging (CMR) in young adults after neonatal arterial switch operation (ASO) in transposition of the great arteries (TGA)

Hövels-Gürich H. (1), Hamada S. (2), Kirschfink A. (2), Mühler E. (1), Kerst G. (1), Marx N. (2), Frick M. (2)

Department of Paediatric Cardiology, University Hospital Aachen, Germany (1); Department of Cardiology, University Hospital Aachen, Germany (2)

Objectives:

Monocentric prospective study to evaluate objective exercise capacity, rate and extent of stress induced myocardial ischemia and abnormal pulmonary blood flow distribution (Pbfd) at rest and under dobutamine stress.

Methods:

49 unselected patients (age 18-28 y) underwent CPET (bicycle) and CMR (1.5 Tesla) at rest (coronary scan, cine, phase contrast flow) and under dobutamine (DSMR; cine, phase contrast flow), followed by angiography and late gadolinium enhancement (LGE).

Results:

CPET:

All patients reached maximal exercise effort (HRmax 174.0 ± 17.3 /min). Peak oxygen uptake (% of predicted peak VO₂) (Wasserman): 85.8 ± 10.4 % (borderline normal); norm percentile (Dubowy, 2008): 13.2 ± 12.2 (z-value = -1). Ventilatory efficiency VE/VCO₂ at anaerobic threshold: 26.9 ± 2.6 (normal 23 - 30).

CMR:

Coronary arteries: 1x known prox. LAD occlusion (collateralized via RCA; coronary type AB1), 1x proximal LCA-occlusion, LIMA-bypass). No other stenosis or kinking of the proximal coronary arteries. Coronary classification (Sauer): 38x A1 (normal type), 5x AB1 (RCX originates from RCA), 6x B1 (right single ostium, LCA retroaortal). 3 patients reclassified compared to operation report.

Ventricular function: LV: no regional wall motion abnormalities; 5x EF < 55% (43%-54%). 1x non compaction cardiomyopathy. RV: all EF > 48%. 1x RVOT-aneurysm.

Neo-aortic regurgitation : 2x moderate (reg. fraction 16% and 19 %).

DSMR: 47/49 reached target heart rate; 1x termination at 120/min due to complex ventricular ectopic beats, 1x termination at 160/min due to trigger problems. 1 patient with known LAD occlusion had strong chest pain and hypokinesia in 1 segment under maximum stress.

Pbfd at rest: 6/49 patients had prior intervention for RVOT/PA-stenosis. 6/49 abnormal Pbfd (>2:1). 4/49 relevant stenosis of the mean PA (>2.5 m/s); -> cumulative rate of relevant RVOT/PA stenosis or abnormal Pbfd:12/49 (25%).

Pbfd under DSMR: no worsening compared to Pbfd at rest. On individual patient level, no worsening of abnormal Pbfd.

LGE: no myocardial scar. 1/49 intramyocardial fibrosis.

Conclusion:

CPET functional status was borderline normal. CMR found no new proximal coronary stenosis or kinking. 2/49 DSMR were pathologic. 12/49 patients (25 %) had relevant RVOT/PA stenosis (6 new, 6 prior known). Pbfd did not worsen under dobutamine stress.