Reduced exercise capacity in patients operated for ventricular septal defect

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Introduction: Ventricular septal defects (VSDs) are generally closed very simply, and postsurgical the patients are considered healthy with normal physical capacity. However, if this is actually true, is still not clarified, and is therefore the aim of this study.

Methods: We tested cardiopulmonary exercise capacity in 21 patients and 11 healthy control subjects on an ergometer cycle. Pulmonary ventilation and gas exchange were simultaneously measured breath by breath with Jaeger MasterScreen CPX®. Each test was performed as a maximal incremental test. The graded cycling test protocol was chosen individually to ensure test time to be approximately the same for all participants. During the test session respiratory gas exchange was measured along with heart rate, blood pressure, and EKG. Endpoints were: maximal oxygen uptake, maximal workload, and anaerobic ventilatory threshold. For the last-mentioned both absolute and relative thresholds were measured using V-slope. Before each test a spirometry was made to measure FVC, FEV1 and PEF.

Preliminary results: VSD patients had a median age at surgery of 2.6 years (1.5-4.1 years) and 21.1 years (19.8-23.2 years) at the time of examination. Compared to controls they had a markedly, impaired maximal oxygen uptake, median 38.0 ml O2 kg-1min-1 (31.6-40.8 ml O2 kg-1min-1) vs. 45.8 ml O2 kg-1min-1 (41.1-49.9 ml O2 kg-1min-1) in control subjects, p<0.01. Furthermore, absolute and relative anaerobic thresholds were reduced in VSD patients, median 22.1 ml O2 kg-1min-1 (17.5-25.9 ml O2 kg-1min-1) and 60.0% (54.0-72.7%), respectively, vs. 33.5 ml O2 kg-1min-1 (25.1-41.6 ml O2 kg-1min-1) and 76.1% (64.0-86.4%), respectively, p<0.05 for both parameters. Lastly, maximal workload were significantly reduced, median 3.2 W kg-1 (2.7-3.6 W kg-1) vs. 4.1 W kg-1 (3.2-4.3 W kg-1) in control subjects, p<0.01.

Conclusion: Patients with a surgically closed VSD had a markedly reduced cardiopulmonary exercise capacity compared to healthy controls; findings include effort-independent measurements.