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Reduced maximal exercise capacity in adults with small, unrepaired Ventricular Septum Defects

*Maagaard M, Heiberg J., Hjortdal V.
Dept. of Cardiothoracic and Vascular Surgery,
Aarhus University Hospital
Aarhus, Denmark*

Introduction: Ventricular septum defect (VSD) is the most common congenital heart defect with 30% closing spontaneously during childhood. The rest are considered as hemodynamically important and are closed surgically, or not hemodynamically important. Small VSDs considered to have no influence usually remain unrepaired, and long term results for living with a small VSD are still undetermined. Some studies have reported of complications occurring later in life, but common for these studies are that patients are all examined at rest. We exercise-test a group of adults with small, open VSDs and a group of healthy, age-matched controls in order to assess long-term physical condition.

Methods: Maximal exercise capacity is determined in participants on an upright bicycle with an incremental workload protocol, chosen individually on the basis of body mass, gender and exercise habits of the participant. Gas exchange is measured breath-by-breath with Jaeger MasterScreen CPX®. Participants are handed the International Physical Activity Questionnaire for assessment of habitual activity level. Prior to the exercise test, all participants undergo bioelectrical impedance analysis, in order to determine their lean body mass for later matching of the groups.

Results: So far, 14 patients and 16 controls have completed the exercise test, with a mean age of 25.4±5 in patients and 25.5±3 in the control group. No differences were found in age, gender or body mass index between the groups. From impedance analysis we found lean body mass in patients to be 73.4±9%, and 75.5±7% in controls (p=0.5). Both groups reached the targeted test time between 8 – 12 minutes, without differences in maximum heart rate and maximum workload. At maximum exercise level, patients reached a lower maximal oxygen uptake (ml O₂/min/Kg) 35.4±7, compared to the healthy controls 45.0 ±7 (p<0.001). Effort independent endpoint (aerobic capacity) was also lower in patients; 23.3±7 compared to controls 31.1±6 (p<0.003). Neither of this could be explained by a difference in lean body mass, body mass index or the self-reported habitual physical activity level of the individual, calculated from the questionnaire.

Conclusion: These results suggest a reduced cardiopulmonary exercise capacity in adults with small, unrepaired VSDs compared to healthy peers.