Reduced pulmonary function in young adults operated for ventricular septal defect in early childhood: a long-term follow-up

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Introduction: Ventricular septal defects (VSDs) are normally closed in early childhood, and postsurgical the patients are generally considered healthy with normal physical capacity. Nevertheless, we have previously demonstrated reduced peak exercise capacity in this patient cohort, and therefore the aim of this study was to establish whether there are demonstrable abnormalities in pulmonary function during exercise.

Methods: We tested cardiopulmonary exercise capacity in 27 patients and 30 healthy control subjects on an ergometer cycle. Each test was preceded by a standard spirometry at rest, and the exercise test was performed as a maximal incremental test using an individually chosen test protocol. Pulmonary ventilation and gas exchange were simultaneously measured breath by breath with Jaeger MasterScreen CPX®. Our endpoints were minute ventilation and ventilatory equivalents (O2 and CO2) at peak exercise.

Results: In the VSD-group the median age at surgery was 1.9 (95% CI 1.1 - 2.8 years) and the age at the time of examination was 21.1 ±3.1 years in the VSD-group vs. 21.2 ±2.5 years in the control group. Minute ventilation at peak exercise was lower in the VSD-group compared with the controls: 1.4 ±0.4 L/kg/min vs. 1.8 ±0.4 L/kg/min, p<0.01. Likewise oxygen uptake was reduced: 38.0 ±8.2 ml/kg/min in the VSD-cohort vs. 47.9 ±6.5 ml/kg/min among controls, p<0.01. In terms of breath rate and ventilatory equivalents (O2 and CO2) there were no differences between the groups.

Conclusions: During exercise patients with a surgically closed VSD had substantially reduced minute ventilation despite uncompromised ventilatory efficiency compared to healthy controls.