Decreased cardiovascular function late after ventricular septal defect repair

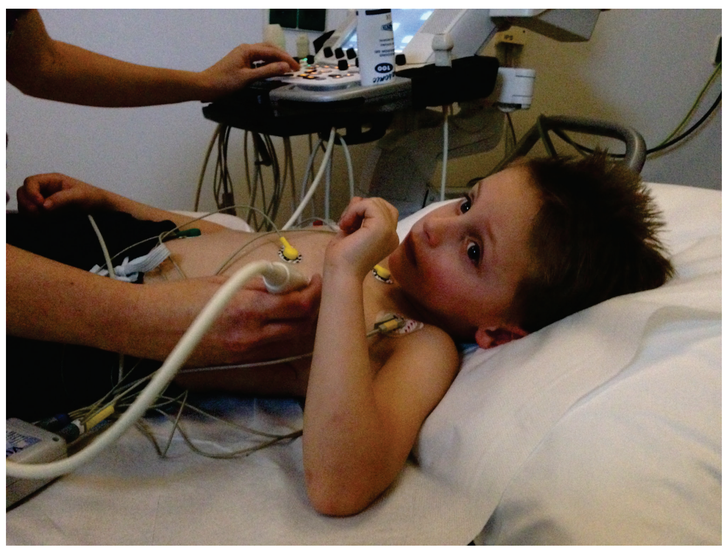
Ineke Nederend[123], Marlou Limpens[1], Derk Jan ten Harkel [3], Nico Blom[3] & Eco de Geus[12]

[1] Department of Biological Psychology, VU University Amsterdam, the Netherlands
[2] EMGO+ Institute for Health and Care Research, VU University Medical Center, Amsterdam, the Netherlands
[3] Department of pediatric cardiology, LUMC University Medical Center, Leiden, the Netherlands

Disclosures: None
Correspondence: i.nederend@vu.nl

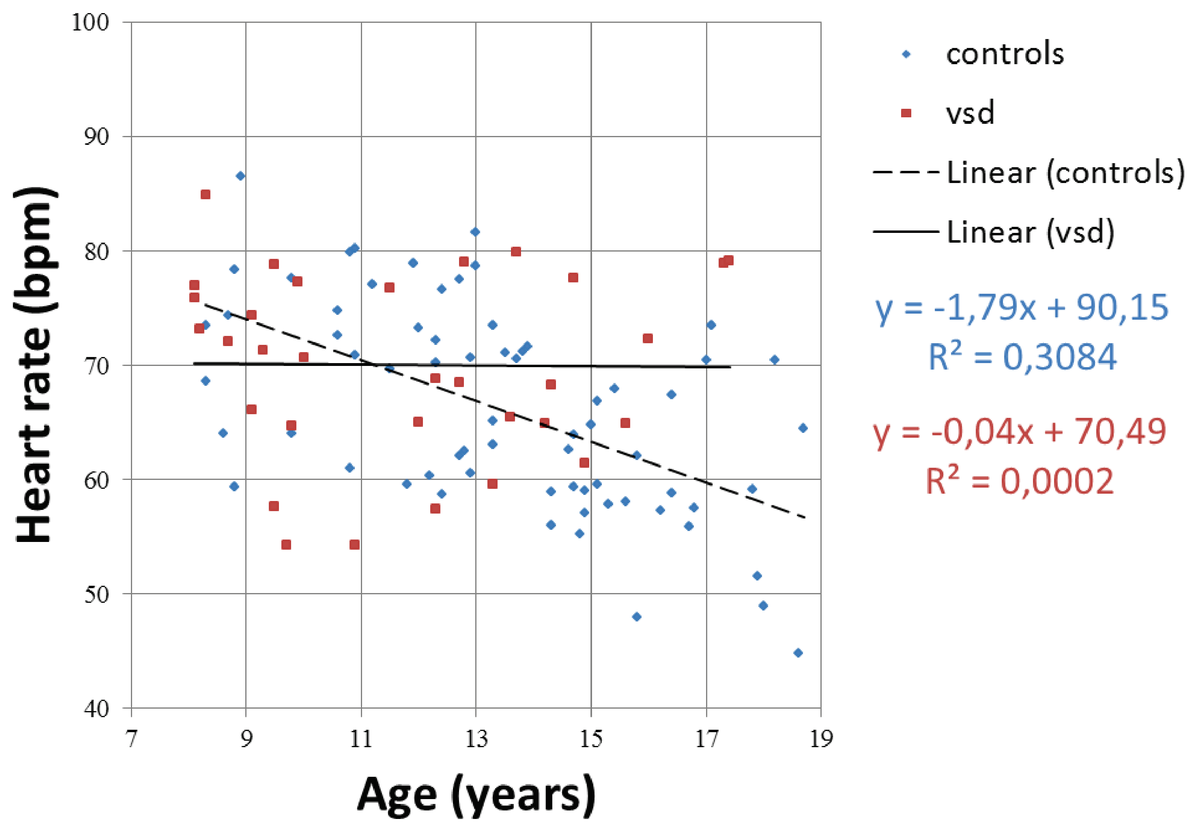
INTRODUCTION Survival after ventricular septal defect (VSD) repair is excellent but in adulthood late residua including conduction disease, arrhythmia and heart failure are not uncommon. The mechanisms behind these late complications are unknown. This study aims to evaluate cardiac function, heart rate variability (HRV), exercise capacity and physical activity in children late after VSD repair.

METHODS 33 patients (♂18, ♀15) after VSD repair and a healthy age-matched control group underwent an echocardiogram, maximal exercise test and 24h holter monitoring. Physical activity including physical education at school, regular biking/walking behavior and sports participation was mapped using a questionnaire.



	Patients	Controls	p
$VO_{2\ peak}$ (ml/kg/min)	40.1 ± 6.6	44.6 ± 7.3	0.001
W_{peak} (watt)	124 ± 51	164 ± 56	0.010
PA (METs/week)	11.6 ± 4	11.1 ± 4	0.789
RV S'	0.10 ± 0.02	0.13 ± 0.02	<0.001
RV E'	0.12 ± 0.04	0.15 ± 0.03	0.001
RV A' (cm/s)	0.06 ± 0.02	0.09 ± 0.02	<0.001
Log LF	3.2 ± 0.3	3.3 ± 0.6	0.031
RR (bpm)	18.9 ± 1.8	18.0 ± 1.2	0.024
PVCs (median, IQR)	1, 4	0, 1	0.019

RESULTS Mean age was 11.7±2.8; age at repair 1.7±2.3y and time after repair 9.9±3y. Right ventricular (**RV**) function, measured by Tissue Doppler Imaging (peak velocities in; **S'**=systole; **E'**=early diastole; **A'**=late diastole) was significantly less in patients compared to controls. Exercise capacity ($VO_{2\ peak}$ **and** W_{peak}) was also significantly less in patients while physical activity (**PA**) did not differ between groups. During sleep, low frequency (**LF**) power HRV was lower in patients. Resting respiration rate (**RR**) was higher in patients compared to controls. During the 24h recording, patients had more premature ventricular contractions (**PVCs**) *(see table)*. Heart rate declined over age in controls but not in patients (p=0.004) *(see graph)*.



CONCLUSIONS 10 years after surgical correction of a VSD, cardiovascular function is decreased compared to healthy controls. This study shows that exercise capacity, cardiac function and heart rate variability are already decreased in childhood. Therefore, it is important to continue follow-up into adulthood in patients after VSD repair.

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