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Topic: 6. Cardiac imaging, congenital and pediatric cardiology

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Biventricular interactions and their impact on exercise capacity in adults with a systemic right ventricle

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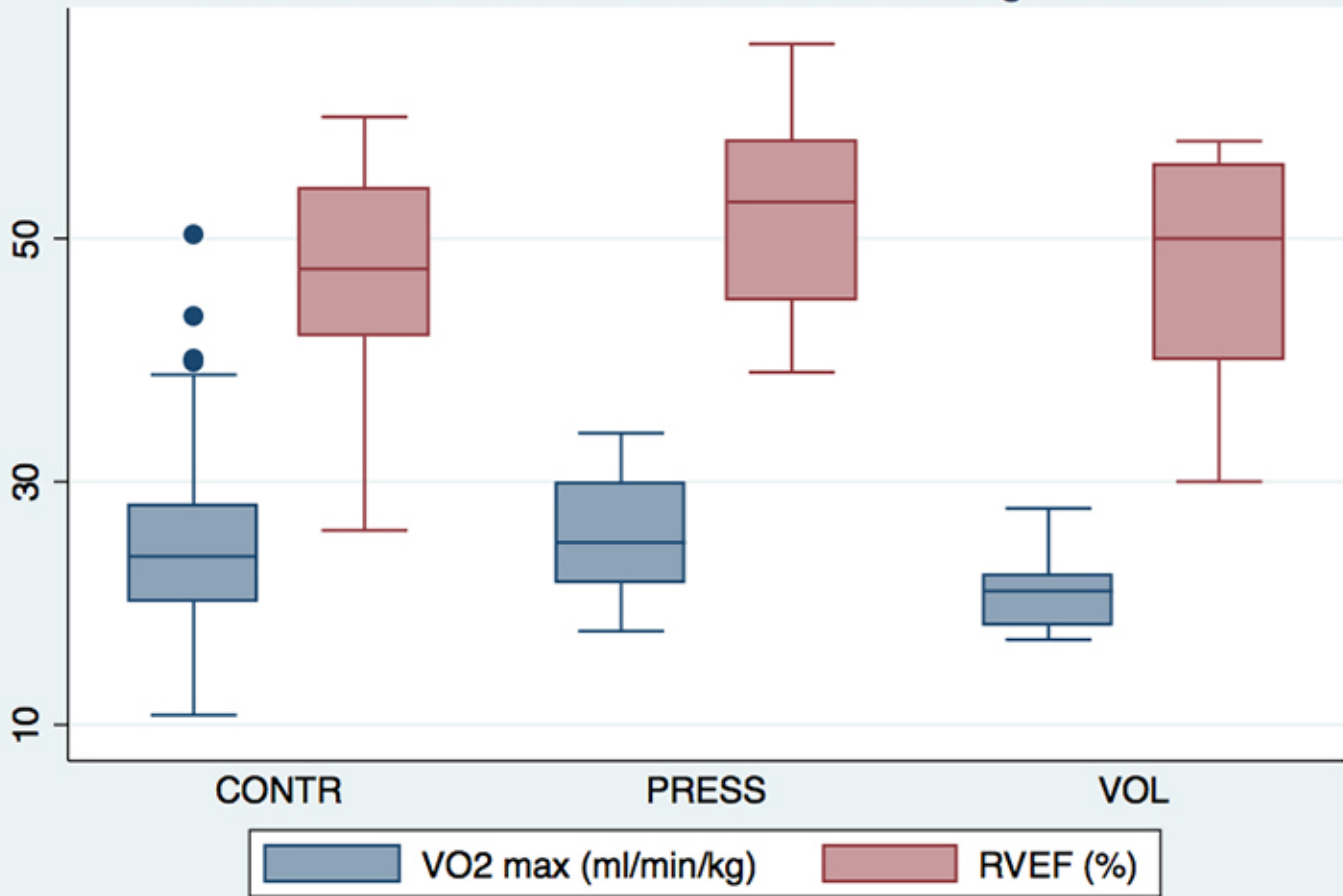
Introduction: In Switzerland there are an estimated 300-500 adults living with a systemic (subaortic) right ventricle (RV). This includes adults with prior atrial switch operations for complete transposition of the great arteries (D-TGA) and adults with congenitally corrected TGA (ccTGA). Although midterm survival is favorable, late outcome is compromised by RV dysfunction. The loading conditions of the subpulmonary left ventricle (LV) altered by interatrial shunting through baffle leaks or by obstruction of the LV outflow tract impact on the position of interventricular septum and hence, the geometry of the RV. We retrospectively investigated exercise capacity and RV function in patients with a systemic RV in relation to LV loading conditions.

Methods: We identified 161 adults with cc-TGA or d-TGA with prior atrial switch operations from a nation-wide registry. In 79 stable patients (pts), a cardiopulmonary exercise study and cardiac MRI or transthoracic echocardiography (in patients with a pacemaker) was performed within 12 months. Volume load (VOL) of the subpulmonic LV was defined as baffle leak with $Q_p:Q_s > 1.5$, and pressure load (PRESS) as LV outflow tract peak gradient > 20 mmHg. Exercise capacity (peak-VO₂) and RV function (RV-EF) were compared between pts with LV pressure or volume load and those without (CONTR). For RV-EF measurement we used only MRI data (available in 66 pts).

Results: Mean age was 33 ± 10 y, 70% were male. N=9 (11%) had cc-TGA, n=70 (89%) D-TGA and an atrial switch procedure. N=60 (76%) were in the CONTR group, n=12 (15%) in the PRESS group and n=7 (9%) in the VOL group. Cardiac MRI was done in 58 pts (73%), 21 pts (27%) had a pacemaker. Mean VO₂max in all 79 pts was 25 ± 7 ml/min/kg (70% of predicted) and did not differ between CONTR and PRESS (Fig). However, pts with a baffle leak (VOL) had a lower exercise capacity (VO₂max 21 ± 3 ml/min/kg [$p=0.038$] or 63% of predicted). Mean RV-EF was $48 \pm 9\%$ and mean LV-EF was $62 \pm 9\%$. RV-EF did not differ between CONTR and VOL, but was higher in pts with a LV outflow tract obstruction ($46 \pm 9\%$ in CONTR and VOL [$n=44$] vs. $52 \pm 8\%$ in PRESS [$n=12$], $p=0.048$). The VOL group had larger LV volumes, and the PRESS group smaller RV volumes compared to the others.

Picture/Graph:

VO2max and RV-EF in relation to LV loading conditions



Conclusion: In adults with a systemic RV, a pressure loaded subpulmonary LV seems to have a beneficial effect on systemic RV-EF. In contrast, a volume loaded LV has no effects on RV-EF, but is associated with decreased exercise capacity.

The presenting author fulfills the above conditions and wants to apply for a travel award: No, please do not consider my abstract for prize evaluation.

Disclosure of Interest: None Declared