

## ROLE OF SEMISUPINE EXERCISE STRESS ECHOCARDIOGRAPHY IN OPERATED FALLOT

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**Background:** Right Ventricle (RV) outflow tract anomalies in operated Tetralogy of Fallot (TOF) leads to RV dysfunction. Due to the difficulties to its assessment, timing of RV outflow reconstruction is still a matter of debate. Semi-supine exercise echo (SEE) has potential for simultaneous evaluation of RV function, pressure, and area changes during stress.

**Aim** to assess the feasibility and value of SEE in operated TOF.

**Methods:** we evaluated 62 consecutive operated Fallot by SEE (mean age  $24 \pm 11$  years, 16 pts were less than 18 y. o.). The following parameters were measured at rest and peak exercise: RV area (from apical 4 chamber view), Tricuspid annular plane systolic excursion (TAPSE), Right ventricular pressure (RVP, from tricuspid regurgitant jet velocity); RV fractional area change (RV-FAC). Within 3 days, all patients also underwent cardiac Magnetic Resonance, Cardiopulmonary Exercise Test and Amino-Terminal pro-Brain Natriuretic Peptide (NT-proBNP) essay.

**Results:** Exercise was stopped at  $105 \pm 35$  Watt; heart rate increased from  $83 \pm 16$  bpm to  $149 \pm 17$  bpm. During exercise, interpretable images for RV FAC analysis were obtained in 56/62 patients (RV FAC feasibility = 90 %). Due to continent tricuspid valve in 7 patients RVP couldn't been measured (RVP feasibility = 89%). There was on average an increase in RVP (rest =  $45 \pm 18$  vs. stress =  $78 \pm 37$  mmHg,  $p < 0.01$  vs. rest), TAPSE (rest =  $15 \pm 4$  vs. stress =  $18 \pm 3$  mm,  $p < 0.01$  vs. rest), and RV-FAC (rest =  $48 \pm 9$  vs. stress =  $52 \pm 8$  %,  $p < 0.05$  vs. rest), with substantial individual variability. In particular, RV FAC increased in 40 ("responders") and remained stable or decreased in the remaining 9 pts, all of them  $> 18$  y.o. ("non responders") (see figure). Compared to responders, non-responders had higher NT-proBNP ( $366 \pm 264$  vs  $127 \pm 92$  ng/l,  $p < 0.001$ ), lower peak  $VO_2/Kg$  ( $15 \pm 4.4$  vs  $22 \pm 5.4$  ml/Kg/min,  $p < 0.001$ ), larger MRI-assessed RV End diastolic volume ( $166 \pm 61$  vs  $130 \pm 42$  ml/m<sup>2</sup>,  $p < 0.05$ ) and end systolic volume ( $86$  ml/m<sup>2</sup>  $\pm 29$  vs  $58 \pm 25$ ,  $p < 0.001$ ) and lower RV EF ( $47 \pm 8$  vs  $56 \pm 8.5$  %,  $p < 0.01$ ).

**Conclusion:** SEE is feasible in patient with repaired TOF and allows the integrated assessment of variation of RV pressures, area, and function during exercise, which usefully complement more conventional indices of hemodynamic burden in these patients. Longitudinal follow-up is needed to better delineate the prognostic value of such SEE results.

