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Factors associated with exercise capacity in patients with a systemic right ventricle

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Abstract
Background Systemic right ventricle (SRV) is a rare and complex congenital heart disease (CHD). Patients with a SVR present with a significant decrease of their exercise capacity. We aimed at identifying clinical and paraclinical factors associated with maximum oxygen uptake (VO2max) in adults with SRV.
Methods This multicentre cross-sectional study was performed from in 2017 in three French tertiary care CHD centres. Adult patients with a D-transposition of the great artery (d-TGA) or a congenitally corrected TGA (cc-TGA) were included. Demographic, clinical, laboratory and imaging data were collected. Univariate and multivariate analyses were performed to identify predictors of impaired VO2max, as measured by cardiopulmonary exercise test (CPET).
Results A total of 111 patients were included in the study (85% d-TGA, median age 37.2 ± 8.2 years). Most patients presented with impaired physical capacity (mean VO2max of 23.3 ± 6.9 ml/kg/min, representing $68.4 \pm 16.6\%$ of predicted values) and muscular deconditioning (mean ventilatory anaerobic threshold (VAT) of $32.7\% \pm 10.9\%$ of the predicted values). In univariate analysis, VO2max correlated with professional status, NYHA functional class, BNP level, the type of SRV, SRV systolic dysfunction, the severity of tricuspid regurgitation, the presence of a pacemaker or an implantable defibrillator, the VAT, the maximum load, and the maximal heart rate during exercise. In multivariate analysis, the VO2max remained affected by the NYHA functional class. The final multivariate model explained 49% of the variability of VO2max.
Conclusion NYHA functional class is the strongest predictor of impaired exercise capacity in adult patients with SRV.
Keywords Systemic right ventricle; Cardiopulmonary exercise test; NYHA functional class; Congenital heart disease
Disclosure of interest The authors declare that they have no competing interest.

PC 5
Pulmonary artery 3D printing to plan percutaneous pulmonary valve implantation in Tetralogy of Fallot patients with large native outflow tract

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Abstract
Background Percutaneous pulmonary valve implantation (PPVI) is a challenging intervention, especially in Tetralogy of Fallot (TOF) patients with large native outflow tract. We assess the ability of 3D printing to predict PPVI success.
Methods We retrospectively printed 15 cardiac models with flexible photopolymer resine from tomodensitometry. Patients (Median age 40 years old [26-56]) had TOF with large regurgitant native outflow tract. Especially patients with complex PPVI procedures were selected. Printing method was adjusted to mimic pulmonary artery elasticity. Balloon sizing was performed under fluoroscopy on the models and in patients. Models analysis were performed blinded to outcome.
Results Median minimal landing zone diameter was 25 mm [22-27]. Two patients were referred for elective surgical valve replacement (outflow tract measured at 32 mm after sizing in one and at 34 mm after prestenting in the second). Sapien 3 valves were implanted in 13 patients after prestenting.
Shape of the outflow tract was described as tubular ($n=8$), sandglass ($n=1$), chicane ($n=2$), funnel-shaped ($n=2$) and ballooning ($n=1$) on models. Correlation between invasive and models balloon calibration was not significant. Using Bland-Altman analysis, mean difference between the 2 techniques was 0.4 ± 3.9 mm (Fig. 1). Two patients were considered unsuitable for PPVI based on models. These 2 patients matched with the 2 referred for surgery. Assessing size and shape of the models, 2 interventionalists rated the expected complexity of PPVI from straightforward ($n=10$), to moderate ($n=2$) and complex ($n=2$). Analysis of outcome confirmed
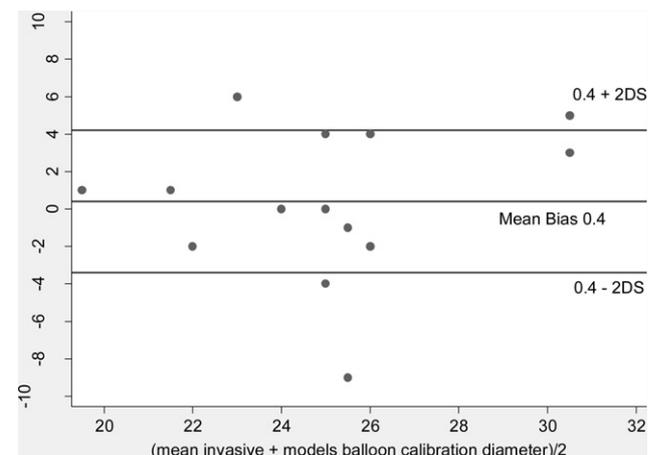

Fig. 1