PC 4

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 ± 16.6% of predicted values) and muscular deconditioning (mean ventilatory anaerobic threshold (VAT) of 32.7% ± 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.

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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 ($n = 8$), sand-glass ($n = 1$), 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

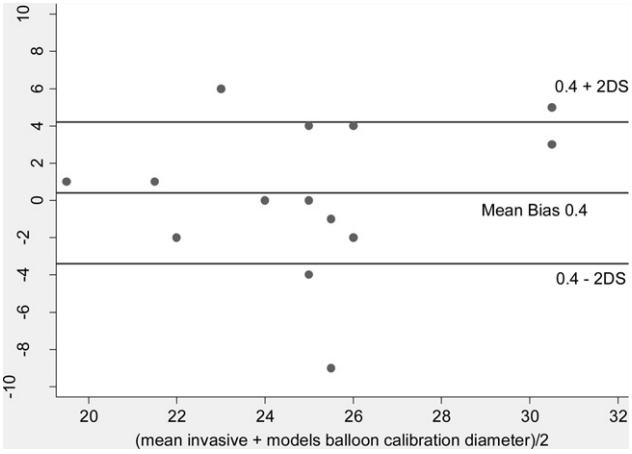

Fig. 1

challenging procedures in 2 and uneventful in 12. Kappa agreement coefficient was 0.44, $P = 0.007$.

Conclusion 3D printed cardiac models are useful to predict challenging PPVI but lacks accuracy to size the outflow tract. Prospective studies are needed to corroborate these preliminary results and better define the interest of this new tool before PPVI.

Disclosure of interest The authors have not supplied their declaration of competing interest.

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PC 6

Longterm outcome after branch pulmonary artery stenosis stenting in congenital heart diseases

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Abstract

Introduction Primary or secondary branch pulmonary artery (BPA) stenosis complicates the management of congenital heart diseases. Surgical pulmonary plasty is the gold standard treatment, but is associated with a low freedom from reintervention rate of 46% at 10 years [1]. As an alternative, percutaneous or intraoperative stents have been implanted to improve efficiency, but limited data are available concerning longterm outcome [2—5]. We hypothesized that prognosis of intraoperative or percutaneous stent implantation in BPA stenosis is good with further re-expansion and limited complications.

Methods We conducted a retrospective cohort study at CHU de Tours. All stents implanted by surgery or catheterization in BPA with a minimum follow-up of 12 months and at least 1 catheterization control have been included. The primary endpoint was composite, combining cardiovascular mortality, surgical stent removing or percutaneous implantation of a new homolateral stent.

Results Between February 2007 and December 2017, 76 stents in 51 patients were included (62 stents implanted by surgery, 14 by catheterization). At the time of implantation, patients had mean age and weight of 56.3 months (IQR 65.4) and 17.4 kgs (IQR 11.0) respectively. There was 68.4% of secondary stenosis. Mean BPA minimum size was 4.1 mm (mean Z-score of − 5.0), and mean initial stent diameter was 9.1 mm. During a mean follow-up of 5.3 years (range 0—11,2 years), freedom from primary endpoint was 86.8% (CI 79.6—94.8%) at 1 year, 78.9% (CI 70.2—88.6%) at 2 years, 71.5% (CI 61.9—82.7%) at 5 years and 69.6% (CI 59.6—81.2%) at 10 years (Fig. 1). Among surviving stents, mean BPA size Z-score at last evaluation was increase of +4.69 compared to initial size ($P < 0.001$) (Fig. 2). A lower BPA size at implantation seemed to be associated with a worse outcome of the stent ($P < 0.05$).

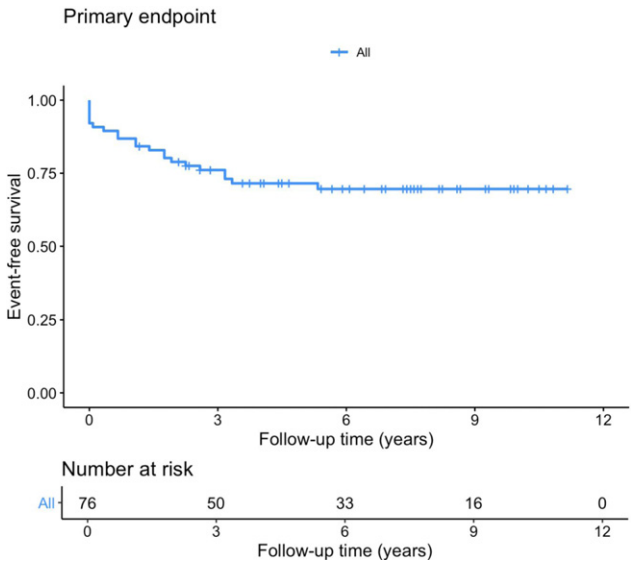

Fig. 1 Freedom from cardiovascular mortality, surgical stent removing or percutaneous implantation of a new homolateral stent (Survival analysis Kaplan-Meier).

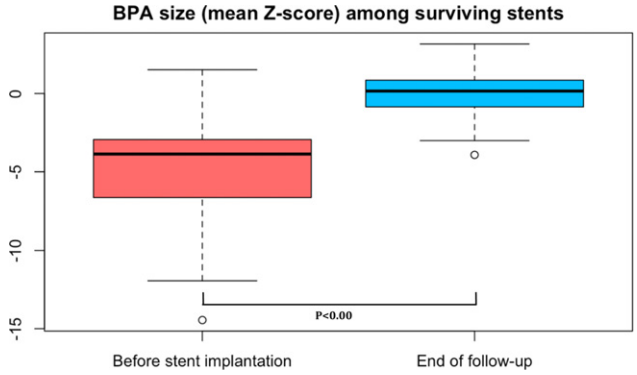

Fig. 2 Branch pulmonary artery (BPA) size (mean Z-score) before stent implantation and at the end of follow-up among surviving stents.

Conclusion Our results suggest that percutaneous or intraoperative stent implantation could constitute a good alternative to BPA plasty alone.

Keywords Congenital heart disease; Branch pulmonary artery stenosis; Stent

Disclosure of interest The authors declare that they have no competing interest.

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