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Transcatheter valvotomy in neonates with pulmonary atresia with intact ventricular septum and duct-dependent pulmonary valve stenosis: who needs complementary intervention?

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Transcatheter pulmonary valve perforation/dilation has improved outcome of neonates with pulmonary atresia-intact ventricular septum (PA-IVS) and duct-dependent pulmonary valve stenosis (PVS). We investigated parameters related to Blalock-Taussig (BT) shunt following successful transcatheter procedure and mid-term outcome.

From 2003 to 2015, 65 consecutive neonates with PA-IVS (n=29) and duct-dependent PVS (n=36) underwent transcatheter pulmonary perfusion/dilation and were retrospectively included.

Catheterization (median age 4 days, median weight 2.9 kg) was successful in 59 (91%). Among the 6 remaining patients, 1 died (PA perforation) and 5 underwent surgical valvotomy associated with a BT shunt in 3 (1 death). After successful catheterization, 9 patients required a complementary BT shunt. BT shunt was needed more frequently in patients with smaller tricuspid anulus (9.9 vs 12.8 mm, p=0.03 Z-score: -1.9 vs -0.8, p=0.03), smaller pulmonary anulus (5.4 vs 7.1 mm, p=0.03 Z-score: -2.5 vs -1.5, p=0.03) and with bipartite right ventricle (44.4% vs 14.0%, p=0.05). Shunt intervention was related to longer mechanical ventilation (p=0.0002), in hospital-stay (p=0.04) and higher severe morbidity (12.6% vs 55.6%, p=0.01) but not mortality. Global severe morbidity (18.7%) included e.g. necrotizing enterocolitis and septic shock. Global early mortality was 11% (n=7/65). Among the 58 survivors, 56 patients (96.5%) achieved a biventricular circulation after a median follow-up of 1 year [0.2-3.3], including 7 with a previous BT shunt. Two patients were repaired on a one and a half ventricle strategy following BT shunt.

Transcatheter valvotomy for PVS or PA-IVS is efficient to achieve biventricular repair in most suitable candidates. However, in neonates with a small tricuspid valve and/or pulmonary valve annulus, a systemic to pulmonary shunt can be necessary. Even if early morbidity and mortality remains an important issue, an excellent mid-term outcome is expected.

Conflict of interest The authors have not transmitted any conflicts of interest.

CO 7

Outcomes after protein-losing enteropathy in univentricular hearts: A multicenter study

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Background Protein-losing enteropathy (PLE) is a rare but severe complication after Fontan surgery in patients with univentricular hearts (UVH), with compromised outcomes since mortality is high and treatment efficiency limited.

Methods A retrospective observational study was carried out in 16 Pediatric Cardiology Centres in France, including all UVH patients diagnosed with PLE after Fontan surgery (study period from 1998 to 2014). Results PLE was diagnosed in 35 patients at a median age of 9.7 years and a median delay after Fontan surgery of 3.6 years. Cardiac catheterization at diagnosis revealed a hemodynamic dysfunction of the Fontan circulation in 63%. Treatment modalities included medical treatment alone (MT) in 46% (n=16/35) or combined treatment (CT) (i.e. interventional or/and surgical therapy associated to medical treatment) in the other 54% (n=19/35). Treatment was considered to be efficient in case of normalization of albumin level (>30g/l). MT led to complete recovery in 13% (n=2/16), to transient improvement in 31% (n=5/16) and to no improvement in 56% of patients (n=9/16). Two MT patients (13%) were transfected: one recovered, one died. CT led to 21% recoveries (n=4/19), 37% transient improvements (n=7/19) and to no improvement in 42% patients (n=8/19). 37% (n=7/19) in CT group died.16% (n=3/19) underwent heart transplantation but all of 3 subsequently died. Five and 10 years survival were 89.7% (CI95%:±11.3%) and 74.9% (CI95%:±21.3%) respectively (median follow-up: 4.5 years [0.5-21.7]). Univariate Cox analysis did not reveal any risk factor for “death” nor for “death and transplantation”.

Conclusions Despite decreased mortality, PLE remains a significant burden after Fontan surgery since complete recovery is rare and treatment modalities are unsatisfying. Heart transplantation as ultimate therapeutic option carries a high risk. Further studies are needed to develop innovative treatment strategies and improve outcomes.

Conflict of interest The authors have not transmitted any conflicts of interest.

CO 8

Does acute kidney injury increase respiratory morbidity in post-operative course in tetralogy of Fallot?

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Objective Acute Kidney Injury (AKI) is a frequent complication after a pediatric cardiac surgery, especially in neonate and in pre-load dependent patients, as Tetralogy of Fallot (TOF). It has been suggested that early extra-renal replacement could provide a benefit to neonate. In Pediatric Cardiac Intensive Care Units, an aggressive protocol of fluid management has to be defined. Our goal in patients operated of TOF was to study if AKI was related to surgical parameters and influenced respiratory morbidity.

Methods 60 patients, under 12 months, who underwent elective surgery for TOF, were studied retrospectively. Based on validated pRIFLE criteria they were separated in 2 groups: the first with a presentation AKI (AKI+) and the second no (AKI–). The median duration of mechanical ventilation, the median survival were 89.7% (CI95%:±11.3%) and 74.9% (CI95%:±21.3%) respectively (median follow-up: 4.5 years [0.5-21.7]). Univariate Cox analysis did not reveal any risk factor for “death” nor for “death and transplantation”.

Conclusions Despite decreased mortality, PLE remains a significant burden after Fontan surgery since complete recovery is rare and treatment modalities are unsatisfying. Heart transplantation as ultimate therapeutic option carries a high risk. Further studies are needed to develop innovative treatment strategies and improve outcomes.

Conflict of interest The authors have not transmitted any conflicts of interest.
Conclusion AKI increases the duration of mechanical ventilation in post-operative course of TOF and is related to the preservation of the pulmonary valve. Using an acute protocol, Pediatric cardiac intensivist needs to be aggressive in fluid management and anticipate the indication of renal replacement therapy.

Conflict of interest The authors have not transmitted any conflicts of interest.

CO 9
Predicting fluid responsiveness in cardiac postoperative children: What about electrical cardiometry?
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Introduction Postoperative fluid management is a milestone of post operative period concerning children with congenital heart disease. Electrical cardiometry (ICON®, Oxyypka Medical, San Diego, USA; Berlin, Germany) is a continuous noninvasive hemodynamic monitor used routinely in our unit. This study try to evaluate reliability of one of its parameters, stroke volume variation (SVV), to predict fluid responsiveness of our patient compared to classical parameters.

Material and methods Patients were included in post operative period. Stroke volume (SV), SVV on electrical cardiometry, cardiac output, central venous pressure, left auricular (LA) pressure, curve variation of invasive blood pressure, central venous pressure, saturation, LA and echography velocity time integral variation. Results are median (95% confidence interval). Responders to volume (SV) had an increase in SV of at least 15% after VE.

Results 37 patients were included and 20 had VE. Before VE, SV weight index (1.48(0.26) vs 1.03(0.28) p=0.04) and SVV (14(2.4) vs 18(3.9) p=0.05) were significantly different between responders and non responders groups, with area under curve and cut off (figure 1) of 0.778 and 1.07 ml/kg and 0.767 and 16%.

All others parameters (clinical, echocardiography or invasive measures) have no significant difference and too low AUC, including delta aortic peak flow velocity on echography and delta invasive blood pressure.

These preliminary results confirm first ones on other bioimpedance device on reliability of SVV and SV weight index (Vergnaud 2014).

Conclusion Noninvasive measures of SVV and SV using ICON seems to give reliable data to guide fluid management in post operative period. Of course, these are preliminaries data, and larger cohort is necessary.

Conflict of interest The authors have not transmitted any conflicts of interest.