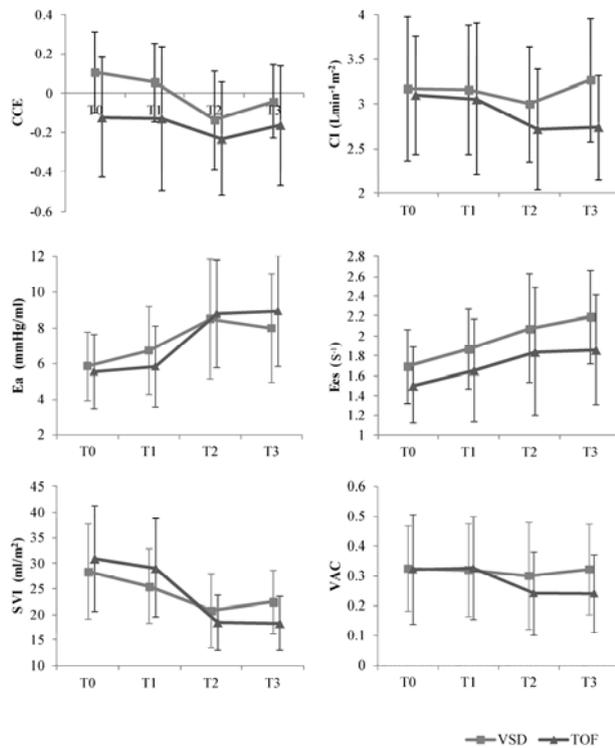


Pressure record analytical method monitoring ventricular efficiency in children with Tetralogy of Fallot undergoing surgery correction

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Introduction: Energy-based endpoints are proved to be superior indicators in accessing hemodynamic status. Cardiac cycle efficiency (CCE) and ventricular-arterial coupling (VAC) derived from pressure record analytical method (PRAM) are parameters related with ventricular efficiency. We aim to compare Tetralogy of Fallot children (TOF) with control ventricular septal defect (VSD) children undergoing correction surgery on profile of ventricular efficiency.

Methods: 50 children with VSD (1.3 ± 1.0 year) and 46 with TOF (1.0 ± 0.8 year) scheduled for complete repair, were enrolled. In operation room, a radial arterial catheter was inserted to allow routine monitoring and the use of PRAM. Heart rate (HR), dirotic arterial pressure, indexed stroke volume (SVI), cardiac index (CI), and CCE were recorded before surgical incision (T0), after pericardium cut (T1), after removal of aortic cannula (T2), end of operation (T3). Left ventricular end-systolic elastance (Ees), left ventricular end-systolic arterial elastance (Ea) and VAC were calculated.



Results: Intra VSD group comparison, CCE was lower at T2 and T3 compared with T0 (P<0.01), higher at T3 compared with T2 (P<0.01). Ees was higher at T1, T2 and T3 compared with T0 (P<0.01), higher at T3 compared with T2 (P<0.01). Ea was higher at T1, T2 and T3 compared with T0 (P<0.01). Intra TOF group comparison, CCE was lower at T2 compared with T0 (P<0.05), VAC was lower at T2 and T3 compared with T0 (P<0.01). Ees was higher at T1 (P<0.05), T2 and T3 (P<0.01) compared with T0. Ea was higher at T2 and T3 compared with T0 (P<0.01). As compared with VSD group, in TOF group CCE was lower at T0, T1 (P<0.01) and T3 (P<0.05), VAC was lower at T3 (P<0.01), Ees was lower at T0, T1, T2 (P<0.05) and T3 (P<0.01). CCE was significantly correlated with VAC at T0, T1, T2 and T3 (P<0.001).

Conclusions: RPAM could track ventricular efficiency changes in children with TOF. Left ventricular efficiency was deteriorated after surgical repair in TOF children because of the marked increase of the afterload and the slight increase of contraction, and it needs to be optimized.