Hemodynamic effects of temporary right ventricular resynchronisation in children after surgery for tetralogy of Fallot

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Introduction: Right bundle branch block (RBBB) associated with right ventricular (RV) electromechanical dysynchrony may contribute to postoperative hemodynamic impairment in tetralogy of Fallot (ToF). We thought to evaluate changes in haemodynamics and tissue oxygenation due to RV resynchronisation during the first 24 hours after surgery.

Patients and Methods: Arterial pressure, cardiac output (PiCCO) and tissue oxygenation (NIRS) were measured during baseline sinus rhythm and after RV resynchronisation using atrial-triggered RV free wall pacing in complete fusion with spontaneous activation in 10 patients (median age 8.7 months). Studied variables were compared in a cross-over design in four 5-minute intervals (baseline rhythm and stimulation 2x each) and results were averaged and statistically analyzed using RM ANOVA.

Results: Resynchronisation reduced the QRS complex duration from 96 (±12) to 64 (±8) ms (p<0.001) and increased arterial systolic (median +4.3, range +2.1 - +13.0% p<0.001), mean (median +4.0, range +1.0 - +9.7%, p<0.001) and pulse pressure (median +4.0, range -2.9 - +22.6%, p=0.007), improved left ventricular contractility (dP/dT max, median +4.6, range -2.3 - +8.7%, p=0.002) and splanchnic (renal) oxygenation (median +1, range 0 - +3 saturation points, p<0.05). There were no statistically significant changes of central venous pressure, cardiac output and cerebral oxygenation.

Conclusion: RV resynchronisation improved hemodynamic parameters and renal oxygenation in children early after surgery for ToF and may be an important part of low cardiac output management in selected patients.

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