

**Perioperative assessment of patients with repaired tetralogy of Fallot undergoing pulmonary valve replacement**

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**Purpose:** Pulmonary valve replacement (PVR) is commonly performed in patients with repaired Tetralogy of Fallot (TOF) to avoid late complications related to severe pulmonary regurgitation or residual RVOT obstruction. However, few data are available concerning perioperative complications. The aim of this study was to evaluate the perioperative complications and to determine predictive factors of the Low Cardiac Output Syndrome (LCOS) in patients undergoing PVR.

**Methods and Results:** 30 consecutive patients with TOF who underwent PVR between 2008 and 2009 were retrospectively enrolled. LCOS was defined according to arterial lactate level >3mmol/l, inotropic support over 24 hours, or renal dysfunction. Mean age at PVR was 29.5 years. Surgical indications for PVR were RVOT stenosis (n=4), severe pulmonary regurgitation (n=25), and mixed lesion (n=1). A stentless porcine aortic root (freestyle, Medtronic) was used in 26 patients (85%) with a range size from 21 to 29 mm. Carpentier-Edwards valve (n=2), Hancock conduit (n=1), and Contegra conduit (n=1) were used for the other patients: PVR was conducted with beating heart using a normothermic cardiopulmonary bypass (CPB) (mean time 77 +/- 25min) in 16 patients. Aortic cross clamp was achieved in 14 patients due to the need of additional surgery or surgeons' habit : CPB mean time was 113 +/- 21min. Overall survival rate was 97% at 90 days. Postoperative complications were uncommon (Ventricular Tachycardia in 6%, Mechanical Ventilation over 24 hours in 6%, renal dysfunction in 10%) except for the LCOS (46%). CPB time over 80 min ( $p<0.01$ ) and aortic cross-clamp ( $p=0.03$ ) increased LCOS (OR=33 (CI=3.18-342.2,  $p<0.01$ ) and OR=6 (CI=1.15-31.3,  $p<0.01$ ), respectively. Surprisingly, age, ventricular volumes and function, and preoperative additional lesion (tricuspid regurgitation, residual pulmonary artery stenosis) were not predictive of perioperative complications.

**Conclusion:** these data underline the major role of myocardial protection during PVR in TOF patients. Short CPB time without aortic cross clamp decreases LCOS. Additional surgical repair requiring aortic cross-clamp and long CPB time should be well balanced with the perioperative complication risk, as tricuspid regurgitation can be improved with the reduction of the right ventricular volume after PVR, and pulmonary artery branch stenosis might be suitable for interventional catheterization procedure.