

## 25 years of the Fontan operation: experience of a referral centre

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The Fontan operation is the final palliative procedure in patients with univentricular hearts. The ideal age to perform the surgery is still unknown and the clinical outcomes of contemporary Fontan survivors need further investigation. We aimed to describe our patients' characteristics and to determine the outcomes after Fontan surgery.

Single-centre retrospective review of 25 paediatric and adult patients who underwent the Fontan operation between 1988 and 2013.

Patients with univentricular hearts with left ventricular morphology predominated (80%). The median age at Fontan operation was  $6,2 \pm 4,2$  years.

Overtime, a shift in surgical practice was observed, the intra-atrial lateral tunnel became the dominant technique after 2000. Overall 68% had an intra-atrial lateral tunnel and 32% a classic or a Fontan variant. About 8% of patients underwent a bidirectional Glenn before Fontan completion, 72% had modified Blalock-Taussig shunts at a median age of  $0,27 \pm 1,25$  years. The mean pulmonary pressures (mPAP) before surgery were  $12 \pm 1,8$  mmHg. Heterotaxia syndromes were correlated with higher mPAP ( $p < 0,009$ ).

Atrial arrhythmias were present in 32%, thromboembolic events in 8% and protein losing enteropathy in 4%. No correlation was found between age at surgery or Fontan technique and poorer outcomes.

In the paediatric group ( $n = 9$ ), median  $11,9 \pm 3,1$  years, mean follow up  $6,6 \pm 7,4$  years, 2/3 of patients are asymptomatic and 1/3 in NYHA class II. 3 patients had atrial arrhythmias, 33% were on diuretics.

In the adult group ( $n = 16$ ), median  $28 \pm 6,58$  years, mean follow up  $18,3 \pm 7,44$  years, 63% were on NYHA class II, 12,5% on NYHA class III, 24,5% were asymptomatic. In this group, patients with classical or a Fontan variant were on antiarrhythmic drugs ( $p = 0,006$ ) diuretics and angiotensin converting enzyme inhibitors ( $p = 0,027$ ), comparatively to the intra-atrial lateral tunnel.

Perioperative mortality was 8%. Re-operation after Fontan surgery was correlated with higher mortality ( $P = 0,04$ ). Freedom from death or transplantation was 88%.

Survival in patients undergoing the Fontan surgery is good, but patients remain at high risk for adverse events. Poor outcomes in Fontan patients are probably not only due to timing, but more importantly related to patient selection.