

Impact of the ventricular morphology on the early postoperative outcome after extracardiac Fontan operation

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Introduction: We sought to assess the impact of right (RV) or left (LV) systemic ventricular morphology on early postoperative morbidity after extracardiac Fontan operation (ECFO).

Methods: A total of 173 consecutive patients (median age 3.9 years, median weight 13.9 kg) underwent ECFO between 1995 and 2013. Pre- and intraoperative data and early postoperative outcomes during the first and second postoperative day were compared between the two groups (LV n=109 vs. RV n=64).

Results: There were no differences in any pre- and perioperative parameters between two groups, except for heterotaxy (LV 9% vs. RV 16%, $p=0.001$) and intraoperative fenestration (LV 21% vs. RV 40%, $p=0.06$). Early postoperative mortality (total 6.4%) and need for postoperative mechanical circulatory support were higher in the RV group (n=8, 12.6% vs. LV n=4, 3.6%, $p=0.025$). Comparing the early postoperative hemodynamics (all data medians), there were no differences in mean PAP between the two groups 24 and 48h postoperatively. On the other hand, RV patients had significantly higher LA pressures and lower mean arterial pressures (MAP24h: LV 65mmHg vs. RV 55mmHg, $p=0.036$; MAP48h: LV 68mmHg vs. RV 54mmHg, $p=0.002$) as well as a greater requirement for inotropic support (i.e. longer than 72 h: LV n=14 of 107 (13%) vs. RV n=21 of 59 (36%), $p=0.001$). Ventilation with nitric oxide inhalation was more often necessary in RV (54% vs. 31%, $p=0.004$). Early extubation <24h (LV n=80, 74% vs. RV n=31, 50%, $p<0.001$) was more common in LV patients but led in the total group to rapid increase of the MAP and decrease of the PAP ($p<0.001$). Signs of acute renal failure with ascites (LV 29% vs. RV 57%, $p=0.001$), oliguria and/or need for dialysis (LV 5% vs. RV 31%, $p<0.001$) were observed more frequently in RV patients. Overall, patients with RV had a longer ICU stay (6 vs. 3 days in LV, $p=0.006$).

Conclusion: RV morphology remains a risk factor for early post-Fontan morbidity despite rigorous patient selection. The optimal strategy to improve outcome in these patients is the use of fenestration and aggressive and timely reduction of the pulmonary vascular resistance.