Follow-up of patients with pulmonary hypertension that underwent late ventricular septal defect closure in Guatemala

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Background

Early diagnosis, referral, and timely surgical intervention can significantly improve outcomes in children with congenital cardiac disease [1]. Ventricular septal defect (VSD) closure is recommended before nine months of age [2]. In Guatemala, referral of patients with congenital heart defects is often delayed, therefore jeopardizing care [1]. We report short and mid-term follow up of patients with right cardiac catheterization (RCC) diagnosis of pulmonary hypertension (PHT) that underwent late VSD closure at Unidad de Cirugía Cardiovascular de Guatemala (UNICAR).

Methods

We reviewed charts of patients with preoperative-RCC diagnosis of PHT [3, 4] who underwent late closure of isolated VSD between January 2010 to December 2018. Those whose preoperative-RCC didn't include a vasoreactivity test with 100% FiO2 and inhaled nitric oxide, extracardiac comorbidities, and syndromes, were excluded. Demographics, hemodynamic data, surgical findings, and echocardiographic data were collected. Patients were asked to visit UNICAR for follow-up clinical evaluation, post-operative RCC, and 6-minute-walk-test. Primary endpoints were pulmonary pressure and vascular resistance (PVR) ≥2 years after surgery. Paired t-test was used for statistical analysis.

Results

Table 1. Sample characteristics (n= 12)

Sex	7 female (58%), 5 male (42%)
Median age	7.5 years (IQR 3-17 years)
VSD type	Non-restrictive 12 (100%), SubAortic 10 (83%), inlet 2 (17%)
Positive Vasoreactivity test	2 (17%) patients (Sitbon-criteria); 5 (41%) patients (Barst-criteria)
Mean time of postoperative follow-up	4.5 years
Pulse oximetry saturation on 21% FiO_2	Preop 93±3%; Postop 97±2% (mean ±SD). ***P*<0.001**
Postoperative 6-minute-walk-test	Completed by 10 (83%) patients; of these, 1 patient failed to walk >500 meters (2 patients were ineligible due to age)

Figure 1. Comparison of preoperative and postoperative median pulmonary artery pressure (mmHg) on 21% FiO_2

Description:
preoperative median pulmonary artery pressure **55mmHg (IQR 42-60mmHg)**, postoperative median pulmonary artery pressure **20mmHg (IQR 17-22mmHg)**, **<25mmHg in 83% of patients**.
***p*<0.05**

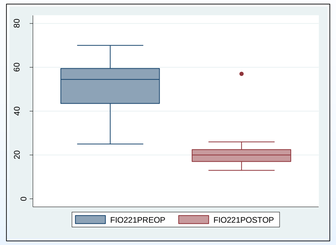


Figure 2. Comparison of preoperative and postoperative median pulmonary vascular resistance indexed to BSA (Wood-Units/m^2) on 21% FiO_2

Description:
preoperative median pulmonary vascular resistance 5.3 Wood-Units/m^2 (IQR 3.8-6.3 Wood-Units/m^2), **>6 Wood-Units/m2 in 50% of patients**; postoperative median pulmonary vascular resistance 2.23 Wood-Units/m^2 (IQR 1.76-2.51 Wood-Units/m^2), **<3 Wood-Units/m2 in 92% of patients**.
***p*<0.05**

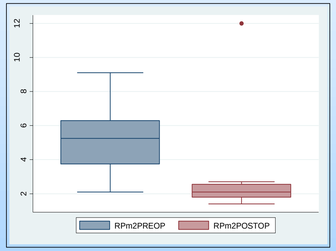


Figure 3. Comparison of preoperative and postoperative Median pulmonary-to-systemic vascular resistance index (PSVRi) on 21% FiO_2

Description:
preoperative median PSVRi 0.45:1 (IQR 0.27-0.55:1); postoperative median PSVRi 0.12:1 (IQR 0.1-0.14:1), **<0.25:1 in 92% of patients**.
***p*<0.05**

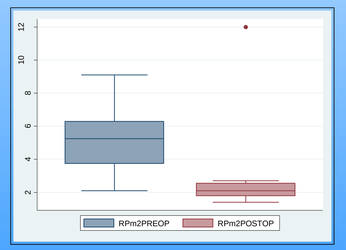
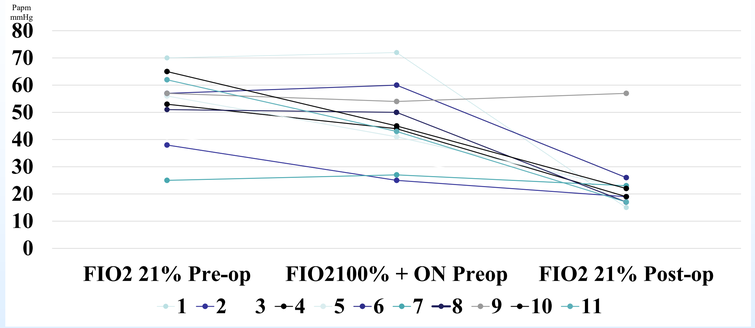


Figure 4. Comparison of preoperative median pulmonary artery pressure (mmHg) on 21% FiO_2 with 100% FiO_2 + inhaled Nitric Oxide and postoperative 21% FiO_2



Conclusions

- In this study, patients with isolated VSD and PHT successfully underwent late VSD closure, even if pulmonary-to-systemic vascular resistance index was high. Moreover, VSD closure resulted in resolution of PHT.
- Despite our sample size, VSD closure appears to be beneficial regardless of patient age.
- Vasoreactivity test does not predict the evolution of pulmonary pressure neither of the PVR. Therefore, we recommend that this test be used exclusively to determine the use of calcium channel blocker as the primary treatment of PHT.

References

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