Factors Influencing Need for Late ASD Closure after Neonatal Repair of Severe Pulmonary Valve Obstruction and Intact Ventricular Septum


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Background: In neonates with critical pulmonary stenosis (CPS) or pulmonary atresia with intact ventricular septum (PAIVS), a nonrestrictive atrial septal defect (ASD) has been speculated to improve the initial clinical course after pulmonary valvotomy (PV) but some concerns exist in terms of its potentially long-term adverse effect on the right ventricle’s (RV) growth and persistent desaturation due to right-to-left (R-L) shunt.

Objective: to assess the relationship between the size of ASD and the need for post-valvotomy reinterventions.

Method: Patients with PAIVS and CPS treated at our center during 2001-2015 were reviewed. Exclusion criteria were associated cardiac malformations and hypoplastic RV deemed unsuitable for biventricular circulation. Clinical and echocardiographic data were retrieved from the hospital’s databases.

Results: In total, 48 patients (18 with PAIVS and 30 CPS) were included. The median follow-up was 5 and 8 years, respectively. One patient with PAIVS died on day 3 after surgical valvotomy and Blalock-Taussig shunt (BTs). The majority (89%) of patients with PAIVS had surgical valvotomy whereas transcatheter valvotomy was used in the majority (87%) of patients with CPS. Palliation with BTs or PDA stenting was used in 13 (72%) patients with PAIVS and in 4 (13%) patients with CPS. Reintervention within 1 month after initial repair was needed in 4 (22%) patients with PAIVS and in 4 (13%) patients with CPS. Later reinterventions were performed in 11 (61%) patients with PAIVS and in 10 (33%) patients with CPS. Of these, 7 (39%) patients with PAIVS and 5 (17%) with CPS underwent ASD closure due to persistent resting desaturation. The latter did not correlate with ASD size after valvotomy (p>0.1). Initial palliation with BTs was the only variable associated with ASD device closure (p=0.04). No patient required univentricular conversion.

Conclusion: Neonatal biventricular repair for severe pulmonary valve obstruction has low mortality but significant need for late reinterventions, mostly consisting of ASD closure due to clinically significant desaturation secondary to R-L shunt. The use of aorto-pulmonary shunt, probably illustrating a more severe form of RV hypoplasia, but not the size of the ASD, predicts the need for later ASD closure due to desaturation.