Fate of pulmonary artery branches after hybrid palliation for hypoplastic left heart syndrome: univentricular palliation versus biventricular repair

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Objectives. To revise midterm outcome of PA in patients who underwent neonatal hybrid stage I palliation and either subsequent comprehensive Norwood stage I-II (UVP) or biventricular repair (BVR). We focused on the overall freedom from re-intervention and on the potentially different impact of hybrid on PA branches development between UVP and BVR.

Methods. Since October 2011, 44 consecutive patients underwent hybrid stage I in our Institution. Twenty-two patients (50%) had surgical stage II and have been regularly followed-up for at least 8 months. Eleven patients had UVP while the remaining 11 had BVR. Patients’ and surgical characteristics were homogeneous. Of note, in the biventricular group 5 patients had borderline left ventricle and would have not been eligible for biventricular repair at birth.

Results. Mean follow-up was 33.6 months (18-43) and 22.1 months (12-31) for UVP and BVR group, respectively. Freedom from re-intervention was 9.6 months (2 days – 28) and 7.5 months (3 – 13) in UVP and BVR group, respectively.

All 11 patients who survived UVP required re-intervention on PA branches. PA surgical enlargement only was adopted in 2 patients while interventional catheterization was performed in 9 patients. Eighteen interventional procedures were performed, consisting in balloon dilatation (12 cases) and PA stenting (6 cases). Left pulmonary artery was more hypoplastic and 6 out of 7 stents were implanted on left PA.

In the BVR group 4/11 patients (36%) needed re-intervention. Balloon dilatation was performed in all patients, one requiring also left PA stenting. In one case surgical enlargement was performed for concomitant occurrence of left ventricular outflow tract obstruction.

Conclusions. Hybrid palliation clearly demonstrated to be a reliable bridge to both UVP or BVR in neonates. However, this approach is associated with a high incidence of PA branches morbidity. According to the literature, need of re-intervention is particularly significant in patients with UVP, apparently due to the bulk of the aorto-pulmonary anastomosis. Conversely, in the biventricular group PA branches morbidity has a lower impact on outcome and, particularly in case of borderline left ventricle, PA disease is clearly less significant compared to the benefit of a delayed biventricular repair.