128. Does Perioperative Left Pulmonary Artery Stenting during Comprehensive Stage 2 procedure impact Fontan candidacy?

Objective: Our center has adopted and refined the hybrid strategy for Hypoplastic Left Heart Syndrome (HLHS) and variants utilizing several pulmonary artery reconstructive techniques during the Comprehensive Stage 2 (CS2) procedure. Since 2017 planned, preemptive left pulmonary artery (LPA) stenting has been employed. We hypothesized that LPA stenting promotes adequate growth and does not negatively impact Fontan candidacy. Thus, in this single-center retrospective cohort study, we report our initial clinical experience with preemptive LPA stenting during CS2.

Methods: From 2002 to 2020, 159 patients underwent Hybrid Stage 1 (HS1) palliation followed by CS2 procedure. Patients were divided into two groups: those who did not receive a perioperative LPA stent (n=122, Group 1) and those who did (n=37, Group 2). Within the latter, a subgroup of patients had unplanned stent placement prior to discharge following CS2 (n=17, Group 2a) or received planned, preemptive stenting during the conduct of CS2 (n=20, Group 2b). Besides demographic and perioperative data, distal and lobar LPA dimensions from angiography were reviewed and compared between these groups. Data were analyzed using non-parametric statistics.

Results: Median patient age and weight at the time of CS2 and hospital length of stay after CS2 did not differ between Groups 1 & 2 (1: 5.37 vs 2: 5.65 months, p = 0.3421; 6.2 vs. 6.1 kg, p = 0.254; 11 vs 10 days, p=0.186, respectively). Median cardiopulmonary bypass and crossclamp times were significantly greater in Group 1 (265 vs 243 min, p=0.021; 46 vs 26 min, p=0.008). In-hospital/30-day mortality was similar between groups (1: 12/122, 9.84% vs 2: 6/37, 16.21%, p=0.283). Group 2b demonstrated a superior survival compared to Group 2a (p=0.004) but not Group 1 (p=0.143). Preemptive pulmonary stenting significantly increased median distal LPA diameter at the time of CS2 exit angiogram compared to no stenting at all (p<0.0001). Both Groups 2a and 2b significantly increased the pre-Fontan diameter of the distal LPA when compared to Group 1 (6.1 and 6.8 vs 5.7mm, respectively, p<0.0001). In the interstage period, balloon angioplasty was the most common intervention, whereas the incidence of interventions for Groups 1 & 2 was similar (21 vs 22%). A total of 113 patients have achieved a Fontan circulation (71%). Median follow-up time for Groups 1 and 2 were 6.6 and 3.0 years, respectively.

Conclusions: Comparison of CS2 exit and pre-Fontan angiograms provided insights into the consequences of perioperative LPA stenting with regards to pulmonary growth during the interstage period. Perioperative LPA stenting does not adversely affect pulmonary growth. Preemptive stenting is advantageous for LPA growth in preparation for Fontan completion. Ongoing work will elucidate the long-term effects of perioperative LPA stenting on post-Fontan pulmonary artery growth and remodeling.

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Figure 1: (a) Distal LPA diameters (median and range) from Groups 1 and 2 at the time of CS2 exit and pre-Fontan angiograms. (b) Sub-analysis of distal LPA diameters from Groups 2a and 2b vs Group 1. (c) Incidence of interstage interventions between Groups 1 and 2. (d) Distribution of interstage interventions for both groups. Repeat intervention is defined as either secondary balloon angioplasty, stent dilation, or placement of a secondary stent.

* LPA: left pulmonary artery; CS2: comprehensive stage 2