

Background

- Infants born with Single ventricle disease consisting of Hypoplastic left heart syndrome (HLHS) require staged surgical palliation with the first and second stage (superior cavo-pulmonary anastomosis/Glenn) associated with high risk for surgical mortality. Several pre-operative factors are routinely considered to determine candidacy for Glenn (Stage 2) procedure including age at operation and resistance in the pulmonary vascular bed. The effect of relative branch pulmonary artery dimensions (calculated by PA index/ Nakata index) has been studied on outcomes after Fontan (Stage 3 palliation). We aimed to explore the role of Nakata index on immediate post-Glenn outcomes.

Study Design

- We identified all patients born with single ventricle heart disease between January 2014 to January 2021 (N=112) who were treated at our center. Of these, 107 patients underwent Stage 1 surgery and further 82 patients (77%) underwent Stage 2/Glenn palliation. Among these patients, 71 (87%) had HLHS. We studied the post-Glenn outcomes in these patients at the time of discharge, including death and heart transplant. Pre-Glenn hemodynamic data were compared in patients with or without transplant free survival at the time of discharge using standard statistical tests of significance Study data were collected and managed using REDCap.

Conclusions

- Hemodynamic factors associated with death/transplant after Glenn procedure included higher RV filling pressures (RVEDP, $p=0.07$), higher mean PA pressures ($p=0.08$) and a lower Nakata index (mean $135 \text{ mm}^2/\text{m}^2$ vs $182 \text{ mm}^2/\text{m}^2$, $p=0.04$)

Results

	Transplant Free Survival (N=57)	Death/Transplant (N=14)	p Value
Gender			
Male, n(%)	34 (60%)	10 (71%)	
Female, n(%)	23 (40%)	4 (29%)	
Type of Stage 1 Surgery			Fisher 0.1803
Norwood with Sano	49	10	
Norwood with Central Shunt	2	-	
Norwood with BTT	8	-	Chi Squared 0.0967
Hybrid Approach	8	4	
Pre-Glenn Cardiac Cath			
Systemic Saturations (Mean, SEM)	75.2% (0.8)	76.8% (1.2)	NS
Mean PA Pressure (Mean, SEM)	14.9mmHg (1.2)	20.6mmHg (4.4)	0.08
Single Ventricle EDP (Mean, SEM)	6.8mmHg (0.27)	7.9mmHg (0.6)	0.07
PA Index/Nakata Index (Mean, SEM)	182.4 (9.2)	135.2 (5.3)	0.04

Infants born with HLH disease are at a high risk for preoperative and postoperative mortality following Stage 1 and Stage 2 palliation.

Preoperative hemodynamic factors such as higher RV EDP and smaller pulmonary artery size in relation to body size (Nakata index) may help in risk assessment of these infants and can be used for guiding timing of surgery.

