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Background/Hypothesis: Current literature demonstrates outcomes of congenital heart surgery have improved significantly over the past three decades, yet mortality remains high for certain groups of patients. An intricate stratification tool, the STS–EACTS Congenital Heart Surgery Mortality Categories (STAT Mortality Categories), was previously developed from the analysis of over 70,000 operations entered in the Congenital Heart Surgery Databases of EACTS (33,360) and STS (43,934). The discriminatory power of this tool renders it a potential method of standardization when comparing institutional outcomes. The aim of this review was to identify risk factors in neonates treated at our institution utilizing the defined STAT categories. We hypothesized that modifiable factors exist and may differentiate survivors from non-survivors in high risk cardiac operations.

Patients/Methods: A retrospective chart review limited to patients who underwent higher risk-stratified (STAT 4 & 5) congenital heart surgery between Jan 1st 2010 – Dec 31st 2015. Demographics, diagnoses, preoperative factors, and intraoperative & postoperative variables, including complications were collected.

Results: Cohort included 242 patients. Mean age was 8.7 ± 5.6 days. 69.8% underwent STAT 4 and 30.2% underwent STAT 5 procedures. Survival was 92.6%. Weight at surgery was significantly different between survivors and non-survivors (3.35 ± 0.64 vs 3.29 ± 0.67 Kg, $p < 0.001$). Cardiopulmonary bypass time was shorter in survivors (173.29 ± 64.5 vs 301.3 ± 136.7 min, $p < 0.00001$). Various pre- and post-operative factors were also associated with lower rates of survival. Additionally, mortality rates were greater with a biventricular approach, while need for surgical revision was higher in non-survivors.

Conclusions: Data conveys the existence of factors which may differentiate between groups. Certain patients may benefit from single ventricular instead of biventricular approach. The need for revision emphasizes the importance of anatomically and physiologically sound initial repairs. Investigations are ongoing as this may assist patient management strategy regarding high-risk cardiac operations in neonates.

Comparison of Means/Medians Based on Mortality (Survivors vs. Non-Survivors)

Mann-Whitney (Non-parametric) used for continuous variables comparisons; Chi Square used for group comparisons

	Survivors (N=224)				Non-Survivors (N=18)				Total				P-Value
	N	Mean	Std. Deviation	Median	N	Mean	Std. Deviation	Median	N	Mean	Std. Deviation	Median	
Gestational Age (Wks)	222	38.28	2.1	39	18	38.16	2.37	39	240	38.15	2.38	39	0.012
Weight @ Time of Index Surgery (Kg)	223	3.35	0.64	3.36	18	3.29	0.67	3.34	241	3.31	0.66	3.35	0.001
Extracardiac Anomalies	42 / 224; 18.75%				3 / 18; 16.67%				45 / 242; 18.60%				0.827
Need for Non-Cardiac Surgery	32 / 224; 14.29%				0 / 18; 0%				32 / 242; 13.22%				N/A
Pre-Operative:													
Mechanical Ventilation	65 / 224; 29.02%				10/18; 55.56%				75 / 242; 30.99%				0.019
Renal Failure	2 / 224; 0.90%				1 / 18; 5.56%				3 / 242; 1.34%				0.085
ECMO	4 / 224; 1.79%				2 / 18; 11.11%				6 / 242; 2.48%				0.014
Cardiac Arrest	6 / 224; 2.68%				2 / 18; 11.11%				8 / 242; 3.31%				0.054
ICH/Stroke/Seizure	9 / 224; 4.02%				2 / 18; 11.11%				11 / 242; 4.55%				0.165
Infection	28 / 224; 12.5%				0 / 18; 0%				28 / 242; 11.6%				N/A
STAT Category 4	159 / 224; 70.98%				10 / 18; 55.56%				169 / 242; 69.83%				0.17
STAT Category 5	65 / 224; 29.02%				8 / 18; 44.44%				73 / 242; 30.17%				0.17
Operative:													
CPB Time (Min)	182	173.29	64.46	166.5	16	301.25	136.68	280	198	183.63	80.39	172	<.00001
AXC Time (Min)	181	91.68	46.5	83	16	131.5	93.8	92.5	197	94.91	52.71	86	0.093
DHCA Time (Min)	122	19.73	11.91	17	14	37	43.99	23	136	21.51	18.47	17	0.097
Single Ventricle Repair	159 / 224; 70.98%				1 / 18; 5.56%				160 / 242; 66.12%				<.00001
Bi-ventricular Repair	65 / 224; 29.02%				17 / 18; 94.44%				82 / 242; 33.88%				<.00001
Outcomes:													
Re-op for Bleeding	38 / 224; 16.96%				5 / 18; 27.78%				43 / 242; 17.77%				0.248
Surgical Revision	37 / 224; 16.52%				14 / 18; 77.78%				51 / 242; 21.07%				<.00001
Renal Failure	2 / 224; 0.90%				7 / 18; 38.89%				9 / 242; 3.72%				<.00001
ECMO	14 / 224; 6.25%				17 / 18; 94.44%				31 / 242; 12.81%				<.00001
Cardiac Arrest	10 / 224; 4.46%				6 / 18; 33.33%				16 / 242; 6.61%				<.00001
ICH/Stroke/Seizure	8 / 224; 3.57%				6 / 18; 33.33%				14 / 242; 5.79%;				<.00001
Intestinal Ischemia or NEC	4 / 224; 1.79%				0 / 18; 0%				4 / 242; 1.65%				N/A