

Short-Term Outcomes, Risk Factors for Mortality and Functional Status in Univentricular Patients After Norwood Operation: A Single Center Retrospective Study

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Background:

- Univentricular patients after Norwood operation have the highest mortality and morbidity among all congenital heart diseases.
- This study aimed to evaluate the short-term outcomes and examine risk factors associated with mortality after Norwood operation at a high-volume center.

Methods:

- Study Design:** Retrospective single center study.
- Inclusion Criteria:** All patients with single ventricle (SV) physiology who underwent Norwood Operation from 01/2010 – 12/2020 (n = 269).
- Data included patient characteristics, demographics, operative variables, and outcomes.

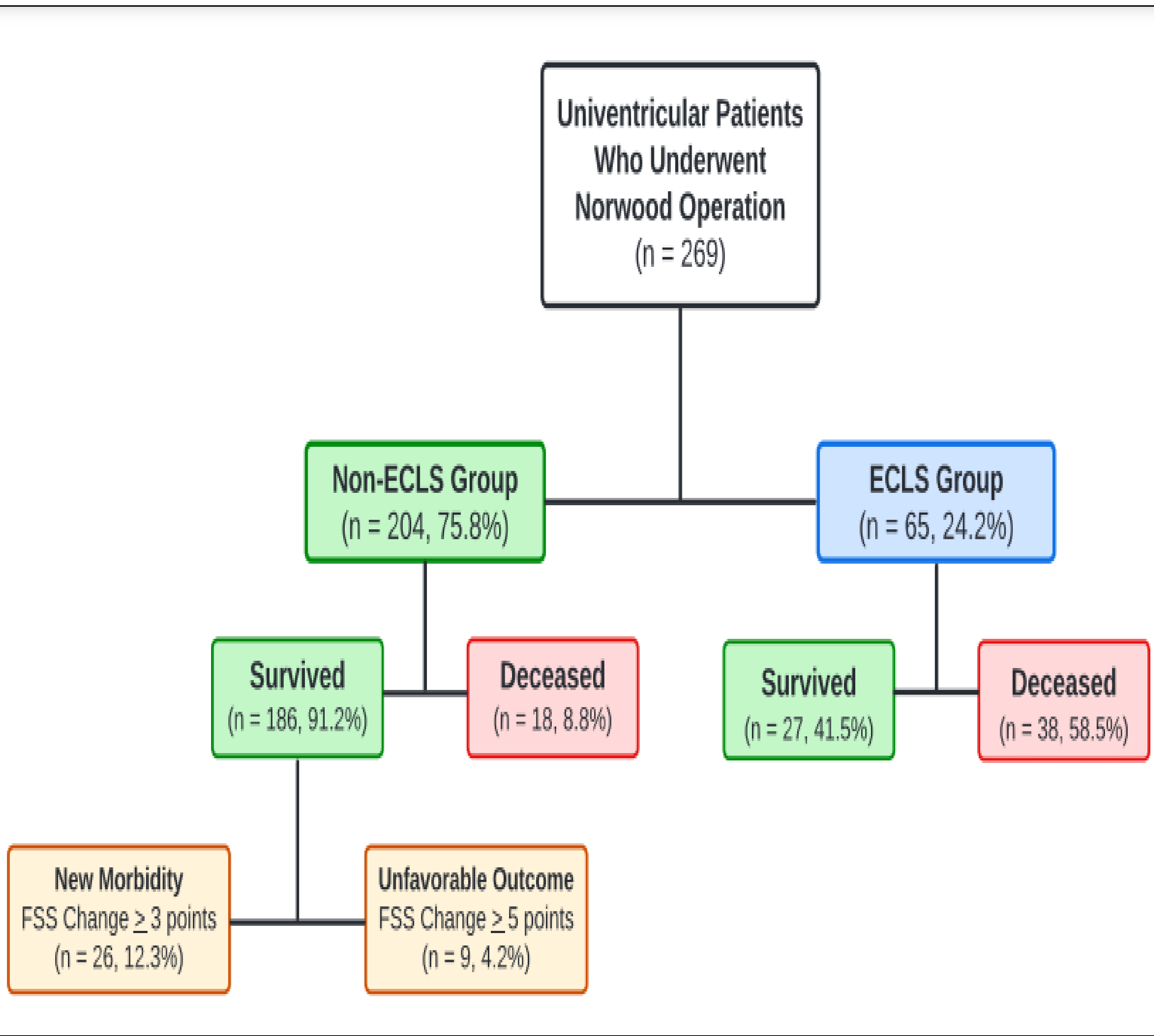
Conclusion:

- SV Patients with worse univentricular function and atrioventricular valve regurgitation (AVVR) on the intraoperative transesophageal echocardiogram (TEE), delayed sternal closure, and required iNO, cardiac catheterization and ECLS support in the immediate postoperative period had higher odds of mortality.
- Patients requiring post-Norwood ECLS support have 14.5 higher odds of mortality.
- Of all survivors, 12% developed new morbidity, and 4% developed unfavorable outcomes.

Table 1. Logistic Regression Examining the Association of Risk Factors with Odds of Death

Variables	Univariable Analysis		Multivariable Analysis	
	Odds Ratio	p-value	Odds Ratio	p-value
Intraoperative TEE AVVR				
No – Trivial – Mild AVVR	Reference		Reference	
Moderate – Severe AVVR	2.6 (1.11, 6.09)	0.028	1.38 (0.44, 4.36)	0.581
Systemic Ventricular Function				
Normal	Reference		Reference	
Mild Dysfunction	3.11 (1.3, 7.43)	0.011	1.89 (0.6, 5.92)	0.274
Moderate – Severe Dysfunction	2.68 (1, 7.2)	0.051	1.28 (0.33, 4.93)	0.717
Cardiopulmonary Bypass Time (min)	1.1 (1.04, 1.16)	0.001	1.04 (0.96, 1.12)	0.339
Post-Norwood iNO on Arrival to CICU				
No	Reference		Reference	
Yes	2.63 (1.23, 5.62)	0.013	0.99 (0.35, 2.83)	0.984
Delayed Sternal Closure				
No	Reference		Reference	
Yes	2.94 (1.44, 5.99)	0.003	1.59 (0.62, 4.11)	0.334
Post-Norwood VIS Score				
First 24 hours	1.19 (1.06, 1.33)	0.003	1 (0.78, 1.29)	0.995
Hours 24 – 48	1.27 (1.14, 1.42)	<0.0001	1.05 (0.84, 1.31)	0.675
Post-Norwood Cath Intervention				
No	Reference		Reference	
Yes	10.48 (5.3, 20.72)	<0.0001	5.07 (2.16, 11.91)	0.0002
Post-Norwood ECLS Requirement				
No-ECLS	Reference		Reference	
ECLS	14.54 (7.29, 29.02)	<.0001	5.44 (2.11, 14.01)	0.001

Figure 1. Flow Chart of Entire Cohort who Underwent Norwood Operation



Risk factors associated with higher odds of mortality following Norwood Operation are:

- Ventricular dysfunction, and AVVR**
- Requirement of iNO, cardiac cath, and ECLS support postoperatively**

Disclosures: None