

MP3-5

Long-Term Transplant-Free Survival of Patients after Lateral Tunnel vs Extracardiac Fontan for Single Ventricle Lesions: Does type of Fontan procedure matter?

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Background: Despite its multiple modifications, Fontan palliation for single ventricle (SV) lesions is associated with significant morbidity leading to premature mortality or need for transplant. After 1990, the two predominant types of Fontan are the lateral tunnel (LT) and the extracardiac conduit (EC). Advantages and disadvantages for each procedure have been reported from previous studies; however, data from direct comparison of long-term outcomes between each type of procedure are sparse. We used data from the Pediatric Cardiac Care Consortium (PCCC), a large multi-center US-based surgical registry, to compare the long-term transplant-free survival for children with LT vs EC Fontan procedure.

Methods: This is a retrospective cohort study of SV patients born between 1990 and 2001 and underwent Fontan palliation in the PCCC. We used the PCCC dataset and linkage data from the US National Death Index and the Organ Procurement Transplantation Network registry to examine long-term survival and transplant status for LT and EC procedure through 2014. To address differences in characteristics of patients we compared survival after application of propensity score matching for potential confounders such as type of systemic ventricle, sex, presence of genetic syndrome, creation of fenestration at the time of Fontan, year of birth and age at Fontan.

Results: Of the 1223 patients identified, 432 (35.3%) underwent LT and 791 (64.7%) EC. LT was performed in younger children (2.4 vs 3.2 yrs of age, $p < 0.0001$) and more frequently in the early years of the study period (Table). In-hospital survival was higher for EC (95.6% vs 90.1%, $p = 0.0002$); however, 10-year survival after discharge was similar for LT and EC (94% vs. 93.2% respectively, $p = 0.325$). Multivariable logistic regression comparing transplant-free survival for 482 propensity score matched patients within this cohort did not reveal any in-hospital (OR 0.72 for LT vs EC; 95% CI: 0.16-3.26) or long-term (OR 1.14 for LV vs EC; 95% CI: 0.61-2.11) benefit for either type of procedure.

Conclusion: LT and EC types of Fontan have similar long-term transplant-free survival outcomes. Additional studies comparing differences in morbidity will be needed to evaluate for potential long-term benefits of the one vs the other procedure.

Table. Characteristics and outcomes of patients after lateral tunnel or extracardiac Fontan

	Total	Lateral Tunnel	Extracardiac	p-value
Whole cohort	N = 1,223	N = 432 (35.3%)	N = 791 (64.7%)	
Male sex	760 (62.1)	276 (63.9)	484 (61.2)	0.3520
Year of birth				
1990 - 1995	463 (37.9)	263 (60.9)	200 (25.3)	<0.0001
1996 - 2000	760 (62.1)	169 (39.1)	591 (74.7)	
Chromosomal abnormality	83 (6.8)	28 (6.5)	55 (7.0)	0.754
Dominant systemic ventricle				
Right ventricle	386 (31.6)	140 (32.4)	246 (31.1)	0.0015
Left ventricle	528 (43.2)	208 (48.2)	320 (40.5)	
Not classifiable	309 (25.3)	84 (19.4)	225 (28.5)	
Fenestrated Fontan	780 (58.0)	322 (78.4)	458 (49.1)	<0.0001
Median age in yrs (IQR)	2.9 (2.3 – 3.9)	2.6 (2.0 – 3.3)	3.2 (2.5 – 4.2)	<0.0001
In-hospital survival	1,145 (93.6)	389 (90.1)	756 (95.6)	0.0002
Median follow up in yrs (IQR)	13.5 (11.3 – 16.6)	16.5 (13.3 – 18.6)	12.5 (10.6 – 15.3)	<0.0001
10-year post Fontan survival	93.4	94.0	93.2	0.325
Propensity score matched	482	N = 241	N = 241	
In-hospital survival	447 (91.7)	224 (93.0)	223 (92.5)	0.861
10-year post Fontan survival	417 (93.2)	208 (92.8)	209 (93.7)	0.859