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Predicting heart transplantation outcome in the failing Fontan patient: A challenging problem

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Introduction: High-risk heart transplantation (HT) currently offers the only sustainable approach to modify the natural history of the failing Fontan circulation. However, it remains unclear at assessment which patients will gain most benefit. The aim of this study was to assess the validity of factors (lower age, shorter Fontan-transplantation interval, lower ejection fraction, pre-transplantation cardiac/renal mechanical support, moderate/severe systemic atrioventricular valve regurgitation, higher MELD-XI score) identified to predict poor post-transplantation outcome [Berg CJ et al AmJCardiol 2017;119(10):1675-1679].

Methods: We reviewed pre-transplantation data for all paediatric and adult patients who underwent HT for failing Fontan between January 2009 and October 2017 at our Institute. The association of all-cause mortality with individual demographic, echocardiographic and clinical variables was assessed using the Cox proportional hazards model.

Results: Thirty-seven patients (median age 21.3 years, range 3.4-43.5) underwent HT for failing Fontan circulation. Median follow-up was 2.8 years (range 0-8.1). Survival was 73% at 1 year and 60.1% at 5 years. Most deaths (10/13) were early and preceded hospital discharge. Factors predictive of higher post-transplantation mortality in our cohort were MELD-XI score, bridging to transplantation with renal replacement therapy and Fontan failure with preserved systolic ventricular function (Table). Transplantation age below 18 years (n=14, 5 deaths) was not a statistically significant predictor of mortality compared to adult age (n=23, 8 deaths) and neither were gender, age at Fontan, Fontan-to-transplantation interval, degree of pre-transplantation systemic AVVR and use of ECMO as a bridge to transplantation.

Conclusion: In this mixed population of children and adults with failing Fontan circulations, higher MELD-XI score, renal replacement therapy and preserved ventricular function predicted post-transplantation mortality. This contrasts with others' findings and underlines the need for multi-centre cooperation to identify robust risk factors that can be utilized in this rare and challenging patient group.

Variable	Hazard Ratio (95% CI)	P value
Male gender	0.697 (0.23-2.12)	0.524
Age at Fontan	1.001 (0.993-1.009)	0.824
Moderate/severe systemic AVVR	0.88 (0.3-2.63)	0.822
Preserved systemic ventricular function	4.53 (1.5-13.66)	**0.007**
MELD-XI	1.14 (1.02-1.27)	**0.025**
Renal replacement therapy	4.9 (1.32-18.22)	**0.018**
Pre-transplantation ECMO	0.046 (0-14107)	0.634
Fontan-transplantation interval	0.999 (0.994-1.004)	0.696
Transplantation age	0.995 (0.95-1.04)	0.825