# [Extracorporeal membrane oxygenation use in the first 24 hours following pediatric heart transplantation: Incidence, risk factors, and outcomes.](https://www.ncbi.nlm.nih.gov/pubmed/30973190)

Godown J, Bearl DW, Thurm C, Hall M, Feingold B, Soslow JH, Mettler BA, Smith AH, Profita EL, Singh TP, Dodd DA.

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**Take-Home Points:**

* **This study between linked SRTR and PHIS databases observed that the incidence of severe primary graft dysfunction necessitating ECMO support in pediatric heart transplant recipients was 7.9%.**
* **Pre-heart transplant ECMO support was the strongest risk factor for in-hospital mortality in patients with cardiomyopathy or congenital heart disease.**
* **Post-transplant in-hospital mortality was most strongly affected by the duration of post-transplant ECMO support, though 90% of patients were decannulated within 7 days.**
* **Post-heart transplant patients supported with ECMO who survive to hospital discharge demonstrated similar long-term survival as unsupported patients.**

***Commentary from Dr. Jeremy Herrmann (Indianapolis), section editor of Congenital Heart Surgery Journal Watch:*** The authors aimed to combine the SRTR and PHIS databases in a linked manner to evaluate primary graft dysfunction in pediatric heart transplant recipients. Specifically, they used these databases to analyze the incidence of, risk factors for, and outcomes of pediatric heart transplant recipients who developed severe graft dysfunction requiring ECMO support within one day of the heart transplant across multiple participating institutions. Patients <18 years of age who underwent heart transplantation between 2002 and 2016 were evaluated, and ECMO billing codes were used to identify patients who required ECMO support following transplantation. Logistic regression models were used to identify risk factors for needed ECMO support following transplantation and in-hospital mortality.

A total of 2,820 patients were evaluated, and of these, 224 patients (7.9%) required post-transplant ECMO support. The median time on ECMO was 2 days with 90% of patients being decannulated within 7 days. The longest period of support was 50 days.

When comparing all patients by need for post-transplant ECMO support, patients in the ECMO group tended to be younger, have a diagnosis of congenital heart disease (CHD), be on ECMO at the time of transplant, be listed as UNOS status 1A, have a graft ischemic time >4 hours, and have other physiologic impairments (e.g., higher bilirubin level, lower creatinine clearance, and inhaled nitric oxide utilization). Multivariable logistic regression revealed factors independently associated with post-transplant ECMO support including age less <5 years and ECMO support at the time of transplant (additionally VAD support for CHD patients).

The mortality rate for post-transplant ECMO support was 14.3%. Of the 85.3% who were able to be decannulated, 87.4% survived to hospital discharge. The authors further assessed risk factors for hospital mortality, and when duration of ECMO support was excluded from the multivariable logistic regression model, only a graft ischemic time >4 hours was an independent risk factor. When duration of ECMO support was included, independent risk factors for hospital mortality included dialysis and duration of support. A diagnosis of CHD was not a significant risk factor in either case. The need for post-transplant ECMO support portended worse patient survival with 75% of supported patients surviving to hospital discharge compared to 96% of patients in the unsupported. However, the supported patients who survived demonstrated an actuarial survival curve similar to the unsupported group.

The authors elucidate several limitations of the study, particularly in how ECMO patients were identified. Other potential factors that may have affected the observed outcomes but were not able to be assessed include preservation and implantation techniques, complications of ECMO that may have affected mortality, and transplant procedure volume by center.

This large study provides a helpful snapshot of how frequently severe primary graft dysfunction occurs in pediatric patients as well as potential clinical factors that may adversely affect outcomes. The incidence of severe primary graft dysfunction occurs in pediatric patients is not trivial, especially in the youngest patients. This information may be important for counseling families about the risks of heart transplantation in this age group.