

Outcome of Pediatric Heart Transplantation in Blood culture positive donors in the United States: A Multi-institutional study

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Abstract

Background: Active infections at the time of organ procurement for heart transplantation poses a potential infection risk for the recipient and may adversely affect graft function. In this multi-institutional study, we evaluated characteristics of donors who were blood culture positive (BCPD) at the time of organ procurement and recipients of such donors. We also evaluated outcomes on morbidity and mortality of recipients receiving BCPD hearts.

Methods: We conducted a retrospective data analysis using the Organ Procurement and Transplant Network (OPTN) data on pediatric patients (≤ 18 years) who underwent primary, single organ deceased-heart transplantation between 1987 and 2015. Recipient and donor characteristics were compared across groups using the chi-square or Fischer's exact test for categorical variables and the Student's t-test or Wilcoxon rank-sum test for continuous variables, as appropriate. Outcome variables with $< 50\%$ reported values were excluded from analysis. SAS PSMATCH procedure utilizing the optimal method of propensity score matching with 1:2 ratios was performed for recipient variables. Kaplan-Meier analysis with log-rank test was used to compare patient survival. A p-value < 0.05 was used to determine statistical significance, and all reported p-values are 2-sided.

Results: Among 9,618 heart transplant recipients, 450 (4.7%) were from culture-positive donors. Culture-positive donors were more often African American (23.8 vs. 19%, $p=0.001$); had tattoos (7.8 vs. 5.3%, $p=0.03$); had pulmonary (64.9 vs. 23.4, $p<0.0001$), urinary (41.3 vs. 5.5, $p<0.0001$) or other (10.4 vs. 3.3%, $p<0.0001$) infections; needed inotropic support (41.3 vs. 26.7, $p<0.0001$) and died of drug intoxication (3.6 vs. 1.2%, $p<0.0001$). Recipients receiving hearts from culture-positive donors were more often Hispanic (18.8 vs. 14.7, $p=0.014$), had a pre-transplant diagnosis of congenital heart disease (19.1 vs. 13.7, $p=0.003$) or restrictive cardiomyopathy (6.4 vs. 4.3, $p=0.003$) and had a longer duration of Status 1A listing (34.6 ± 56.8 vs. 24.9 ± 56.1 day, $p=0.0003$). They were more likely to have been treated for blood stream infections within two weeks prior to transplant (25.3 vs. 16.3%, $p<0.0001$), required inotropic support (46.2 vs. 38.3, $p=0.0007$), ECMO (6.9 vs. 4.8, $p=0.04$), inhaled Nitric Oxide (1.3 vs. 0.5%, $p=0.01$) or ventricular assist device (75.6 vs. 58.5%, $p<0.0001$). The proportion of culture-positive donors increased after 2009, compared to the years prior (7.7 vs. 1.5%, $p<0.0001$). There were no differences between transplant outcomes from culture-positive and negative donors with regards to time to extubation (31.9 ± 171 vs. 21.1 ± 134 hours, $p=0.72$),

hospital length of stay (27.2 ± 29.3 vs. 27.7 ± 31.9 days, $p=0.77$), need for dialysis (7 vs. 6.7%, $p=0.79$), stroke (3.2 vs. 2.8%, $p=0.66$), nor in the incidence of rejection episodes in the first year (28.7 vs. 33.8%, $p=0.07$). Recipients of hearts from culture-positive and culture-negative donors had comparable infection rates (7.5 vs. 11%, $p=0.08$). Moreover, there were no differences in median (IQR) patient survival [$17.7(11.5\text{-not estimable})$ vs. $13.3(12.6\text{-}14.1)$ years, $p=0.15$].

Conclusion: The use of blood culture positive donors for pediatric heart transplantation has increased over time. Recipients of hearts from culture-positive donors appear to be on extensive cardiac support and at high risk for waitlist mortality. Despite this, morbidity and mortality are no different for recipients of blood culture positive and negative donors.

Figure- Kaplan- Meier survival outcomes for patients transplanted with blood culture positive vs. negative donors

