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"Nucleated Red Blood Cells as a Predictor of Extracorporeal Membrane Oxygenation Survival and Survival to Discharge Among Pediatric Patients"

BACKGROUND

Extracorporeal Membrane Oxygenation (ECMO) survival in pediatric patients ranges between 42% and 73%, and is higher in patients with pulmonary disease. A predictive serum biomarker for ECMO survival remains elusive. In our prior study evaluating neonatal ECMO post-cardiac surgery, Nucleated Red Blood Cell (NRBC) value pre-decannulation predicted ECMO survival; and post-decannulation predicted survival to discharge. We investigate if NRBC values throughout pediatric patients' ECMO course predict survival.

METHODS

We retrospectively studied pediatric ECMO patients from 2011-2019 at Children's Hospital New Orleans. Outcomes included ECMO survival and survival to discharge. Variables included ECMO indication, ECMO type (venoarterial vs. venovenous), and NRBC values throughout ECMO. The study was approved by LSU Health Institutional Review Board. Student t-test, chi square, and multivariable logistic regression analyses were performed.

RESULTS

145 patients required ECMO (86 (59.3%) cardiac, 58 (40%) pulmonary, 1 (0.7%) Dilantin overdose). 133 patients utilized VA ECMO; 12 utilized VV. 120 patients (82.8%) survived ECMO, 85 (58.6%) survived to discharge. While multivariable analysis of all patients found several NRBC values predictive of survival, individual analysis of pulmonary patients alone found no association between NRBC values and survival. However, individual analysis of cardiac patients found NRBC peak during ECMO (OR 1.1, 1.0-1.2, p=0.05), NRBC pre-decannulation (OR 1.15, 1.03-1.29, p=0.016), and normalization of NRBC value post-ECMO (71.4, CI 3.8-1000, p=0.004) were all associated with ECMO survival, while NRBC post-decannulation was associated with survival to discharge (OR 1.07, CI 1.01-1.13, p=0.014).

CONCLUSION

NRBC values during ECMO and post-decannulation may predict survival for cardiac patients, but not for pulmonary patients.