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Recovery of end-organs and improved mortality in adult patient on ECMO.

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Recovery of End-Organs and Improved Mortality in Adult Patients on ECMO

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Background

Extracorporeal Membrane Oxygenation (ECMO) is a method of directly oxygenating and removing carbon dioxide from the blood in in patients that require pulmonary and/or cardiac support. Frequently used in the pediatric population, its use is increasing in the adult population. We sought to objectively measure End-Organ function of patients on ECMO using clinical laboratory values as well as to evaluate the correlation of commonly used critical care scoring systems at predicting survival.

Methods

This is and IRB-approved, retrospective review of 28 patients that were placed on ECMO between October 2010 and December 2011. Demographic, pre- and post-ECMO laboratory values and mortality scores (SAPSII/APACHEII/SOFA) as well as complication data was collected and calculated. Our data was analyzed using STATA 12 and statistical significance was set at p=0.05.

Results

Twenty-three patients (82%) were placed on venoarterial (VA) and 3 (10.7%) on venovenous (VV) ECMO. The cohort had a median age of 45.5 years (range 17-68), 15 (54%) were male, 12 (42%) were Caucasian, 12 (43%) were African-American and 4 (14%) were Asian. Twenty-two patients (73%) were successfully weaned off ECMO. Model for End-Stage Liver Disease (MELD) and PaO2/FiO2 ratios improved significantly on patients with liver dysfunction and acute respiratory distress syndrome (ARDS). Lactate levels were also found to improve significantly in patients on ECMO. There was no significant change in renal function for the entire cohort as measured using serum creatinine. Predicted mortality using SAPSII and APACHEII scoring systems decreased for our entire cohort patients, however, SOFA scores were not significantly different pre-and post-ECMO. However, these scores did not correlate with successful ECMO wean or patient survival. Complications occurred in 20 (71%) of our patients, the most common being bleeding (46%). Naturally, there were higher rates of complications in patients who died (80%) versus those who survived (62%). In a subgroup analysis of 11 patients that were successfully weaned off ECMO to recovery, although complications occurred a higher rate (82%), 9 patients (82%) survived to discharge.

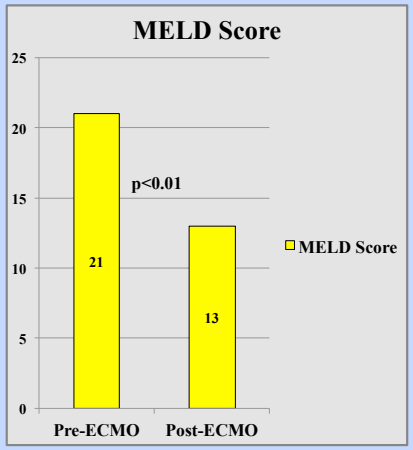

Figure 1: Pre- and post-ECMO MELD score

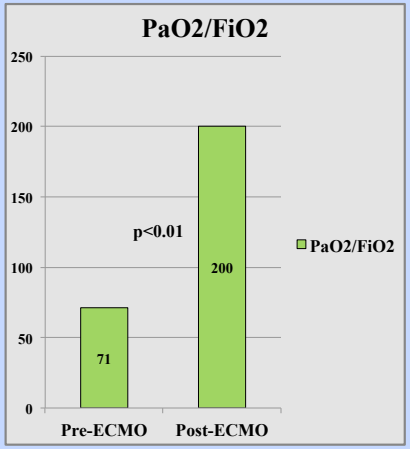

Figure 2: Pre- and post-ECMO PaO2/FiO2 ratio

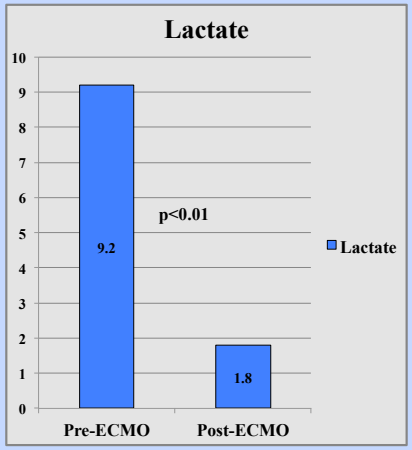

Figure 3: Pre- and post-ECMO lactate

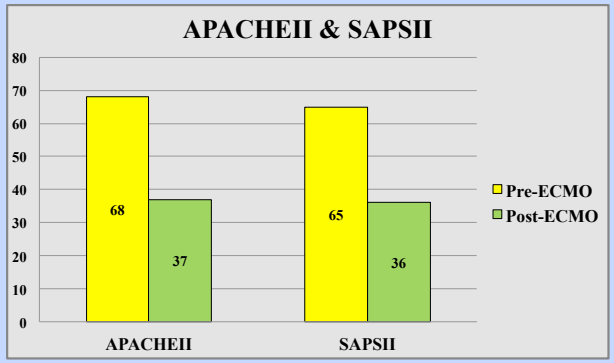

Figure 4: Pre- and post-ECMO APACHEII & SAPSII mortality rate

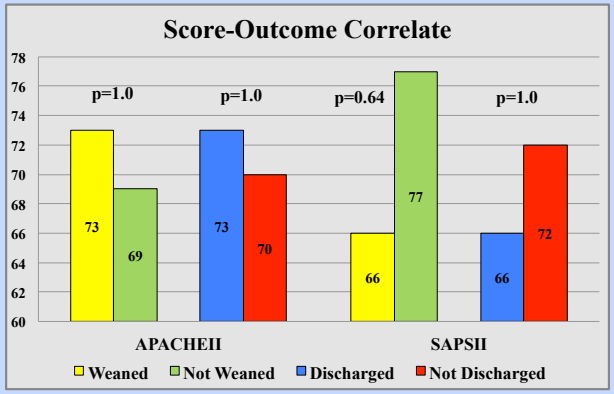

Figure 5: APACHEII & SAPSII predicted mortality and outcome correlation

Conclusions

End-Organ function recovered on ECMO and conferred decreased mortality. However, commonly used mortality scores did not correlate with survival and are not clinically useful in ECMO patients. The high survival rate despite increased complication rates in patients that were weaned to recovery indicates that the ability to wean is an important predictor of survival.