

Outcomes among patients treated with renal replacement therapy during extracorporeal membrane oxygenation: A single-center retrospective study*

David N. Dado DO^{1,5}, Craig R. Ainsworth MD⁶, Sarah B. Thomas MD², Benjamin Huang MD¹, Lydia C. Piper MD², Valerie G. Sams MD², Andriy Batchinsky MD^{3,4}, Benjamin D. Morrow MD^{1,5}, Anthony P. Basel DO⁶, Robert J. Walter MD^{1,5}, Phillip E. Mason MD², Kevin K. Chung MD⁵

Background: Extracorporeal membrane oxygenation (ECMO) and continuous renal replacement therapy (CRRT) are modalities used in critically ill patients suffering organ failure and metabolic derangements. Although the effects of CRRT have been extensively studied, the impact of simultaneous CRRT and ECMO is less well described. The purpose of this study is to evaluate the incidence and the impact of CRRT on outcomes of patients receiving ECMO.

Methods: A single center, retrospective chart review was conducted for patients receiving ECMO therapy over a 6 year period. Patients who underwent combined ECMO and CRRT were compared to those who underwent ECMO alone. Intergroup statistical comparisons were performed using Wilcoxon/Kruskal-Wallis and Chi-squared tests. Logistic regression was performed to identify independent risk factors for mortality.

Results: The demographic and clinical data of 92 patients who underwent ECMO at our center were reviewed including primary diagnosis, indications for and mode of ECMO support, illness severity, oxygenation index, vasopressor requirement, and presence of acute kidney injury. In those patients that required ECMO with CRRT, we reviewed urine output prior to initiation, modality used, prescribed dose, net fluid balance after 72 hours, requirement of renal replacement therapy (RRT) at discharge, and use diuretics prior to RRT initiation. Our primary endpoint was survival to hospital discharge. During the study period 48 patients required the combination of ECMO with CRRT. Twenty-nine of these patients survived to hospital discharge. Of the 29 survivors, six were dialysis dependent at hospital discharge. The mortality rate was 39.5% with combined ECMO/CRRT compared to 31.4% among those receiving ECMO alone ($p=0.074$). Of those receiving combined therapy, non-survivors were more likely to have a significantly positive net fluid balance at 72hrs ($p=0.001$). A multivariate linear regression analysis showed net positive fluid balance and increased age were independently associated with mortality.

Conclusions: Use of CRRT is prevalent among patients undergoing ECMO, with over 50% of our patient population receiving combination therapy. Fluid balance appears to be an important variable associated with outcomes in this cohort. Rates of renal recovery and overall survival were higher compared to previously published reports among those requiring combined ECMO/CRRT.

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