Long Term Kidney Outcomes in Pediatric Patients Following ECMO

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Introduction

Patients undergoing extracorporeal membrane oxygenation (ECMO) are susceptible to kidney injury from a variety of mechanisms, but the long-term kidney outcomes following ECMO remain unclear. We aimed to describe the frequency of kidney-related outcomes at follow up.

Methods and Materials

This was a retrospective cohort study of pediatric patients who underwent ECMO at a single center between 2009 and 2019.

Estimated glomerular filtration rate (eGFR) was calculated from serum creatinine based on the CKiD U25 equation (mL/min/1.73m2) and was used to **define three kidney function outcomes:**

1) occurrence of acute kidney injury (AKI), defined as an eGFR <60 on any occasion which subsequently improved to normal (≥90);
2) eGFR <90 at last follow-up;
3) chronic kidney disease (CKD) defined as eGFR <90 on at least two occasions separated by ≥90 days, without an intervening or subsequently normal eGFR.

All available urinalyses and urine protein-to-creatinine measures were used to determine the presence of **significant proteinuria** (urinalysis protein >=2+ or urine protein/creatinine >0.2

The frequency of **outpatient nephrology follow up** was also assessed.

Results

666 patients underwent ECMO during the 10-year period, 399 (60%) survived at least three months after discharge.

- Of those with creatinine follow up, 61/264 (23%) had an abnormal eGFR at last follow up and 18/264 (7%) met criteria for CKD (Figures 1 & 2)
- Of the 399 survivors, 149 (37%) had available urine data, and of those, 51/149 (35%) had evidence of significant proteinuria. In patients with CKD, 13/18 (72%) had urine data available and 4/13 (31%) had significant proteinuria.
- 42/399 (11%) saw nephrology in consultation at some point following their ECMO hospital admission.

Discussion/Conclusions

A considerable proportion of survivors of ECMO therapy had abnormal kidney function or proteinuria in follow-up however, it is difficult to predict who is most likely to be affected.

This work may inform future studies that that follow patients post ECMO for kidney-related outcomes.

Figure 1: Count of Patients with Kidney Outcomes by Follow-up Time after ECMO Hospital Discharge

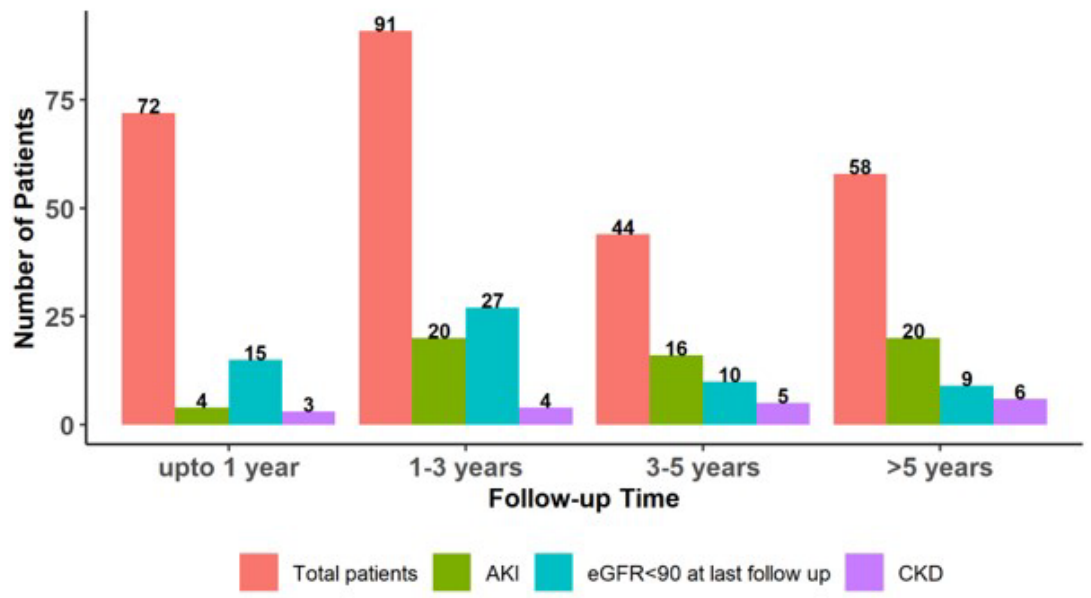
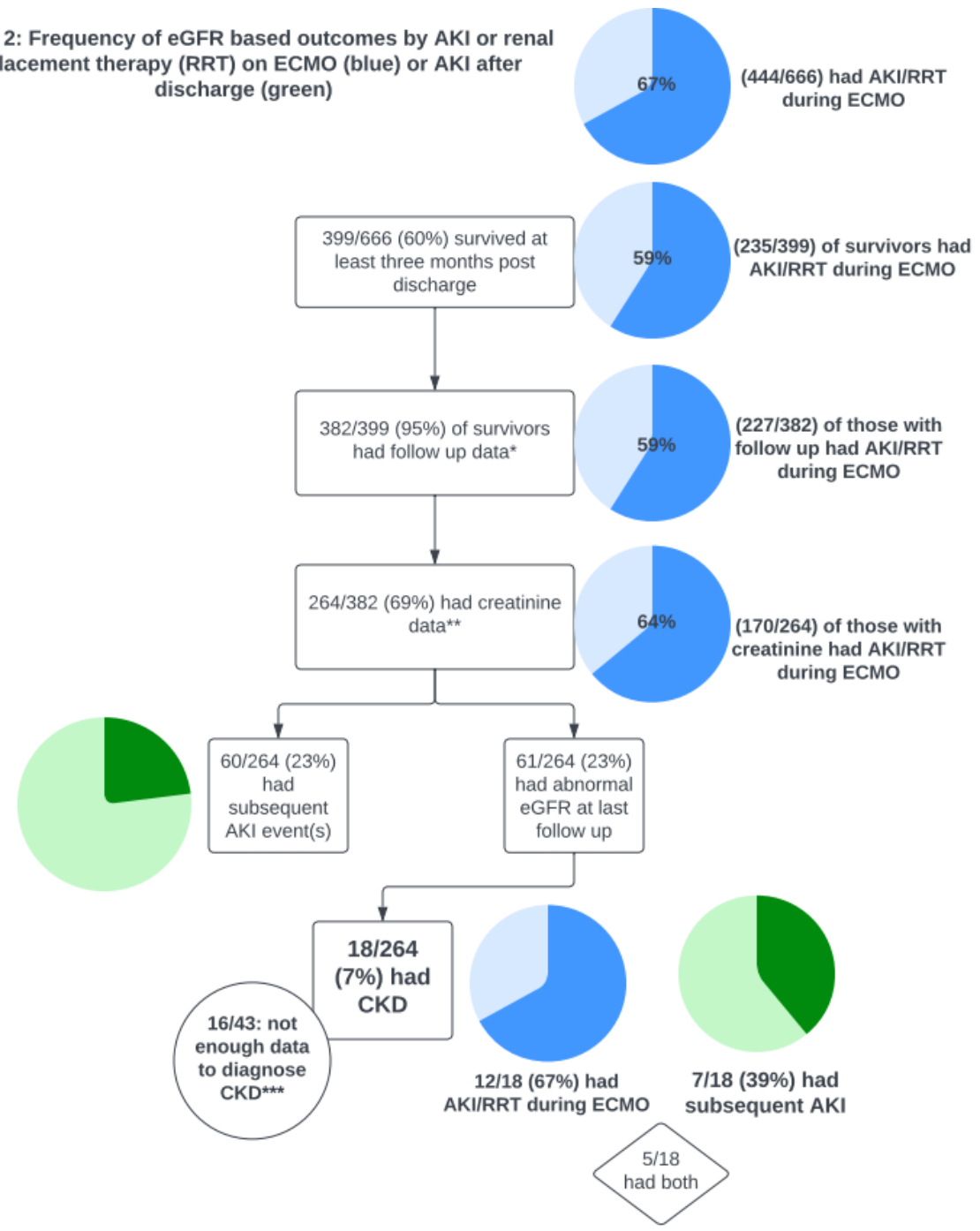


Figure 2: Frequency of eGFR based outcomes by AKI or renal replacement therapy (RRT) on ECMO (blue) or AKI after discharge (green)



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