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Renal outcome after Renal Replacement Therapy during Extracorporeal Membrane Oxygenation in critical ill patients

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Objectives: Acute kidney injury (AKI) developed with high incidence in patients treated with extracorporeal membrane oxygenation (ECMO) and is associated with high risk of developing CKD and ESRD. Renal outcome of adult patients receiving ECMO has been studied in only few studies. We aimed to evaluate renal recovery after renal replacement therapy (RRT) in patients undergoing ECMO and the factors involved within.

Methods: A total 255 patients receiving ECMO treatment between Jan 2009 and August 2019 in Seoul St. Mary's hospital were reviewed by medical chart. Finally, 37 patients with AKI were enrolled. The patients were divided into the ECMO+RRT group and ECMO group based on whether they received RRT for AKI management. The primary outcome was renal recovery as defined by estimated glomerular filtration rate (eGFR) greater than 60mL/min/1.73m2 achieved within 3 month after AKI development. The secondary outcome was cumulative incidence of renal recovery as defined by eGFR above 60mL/min/1.73m2.

Results: The renal recovery rate within 3 month after ECMO was higher in the ECMO group than ECMO+RRT group ($p=0.007$). The rate of cumulative renal recovery with eGFR greater than 60 was higher in the ECMO group than the ECMO + RRT group ($p<0.01$). Therefore, the ECMO+RRT group showed increased risk of developing CKD than the ECMO group. Nevertheless, patients in the ECMO+RRT group never progressed to chronic dialysis and rarely developed incomplete recovery by eGFR < 60 mL/min/1.73m2 eventually. The factors associated renal recovery were identified as RRT duration and APACHE2 score (HR 0.958 and 0.807, respectively).

Conclusions: RRT may help AKI patients undergoing ECMO as an effective bridging therapy. Early detection of those in need for RRT and minimization of RRT duration may be beneficial for better renal recovery.

Figure1. Cumulative renal recovery between the groups during follow-up