

BACKGROUND

- According to the Extracorporeal Life Support Organization guidelines, volume overload and acute kidney injury (AKI) is common among ECMO patients. Pharmacotherapy (use of diuretics) and renal replacement therapy (RRT) are two major tools for volume removal and AKI.
- Continuous RRT (CRRT) has been gaining the most attention as providing consistent fluid removal and is frequently used in critical care settings. Previous studies indicated potential survival benefits from CKRT among ECMO patients. Between 22% to 35% of patients receiving combined CKRT and ECMO, kidney dysfunction did not exist at CRRT initiation. A recent study showed that among patients without remarkable kidney dysfunction, those receiving CRRT and ECMO have better outcomes in terms of survival and as compared to those who did not undergo CRRT

OBJECTIVES

- Therefore, we aimed to evaluate the effects of combined ECMO and CRRT treatment among those with and without AKI on survival rate, length of stay (LOS), and mechanical ventilation duration (MVD) in a larger population.

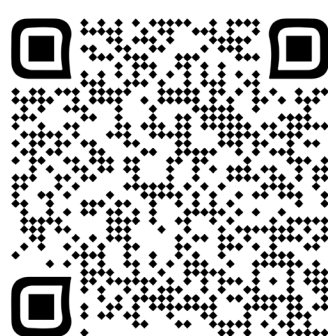
METHODS

- This is a single-center, retrospective cohort study. We collected data retrospectively in tertiary hospitals from 2015 to 2021.
- We included adult patients (≥18 years old) receiving ECMO with or without CRRT and survived to the third day of ECMO.
- ECMO patients receiving CRRT without AKI or AKI stage 1 were categorized based on the indication of CRRT initiation as volume management vs. clearance group.
- Patients who received CRRT while data for AKI diagnosis was unavailable were excluded. We performed a propensity score matching to reduce bias for the estimated treatment effect.

RESULTS

- Of 202 ICU patients who received ECMO, 28 pairs of the volume management vs. clearance group were matched.
- Compared to the clearance group, the volume management group required significantly longer MVD with 16.60 (7.20-43.52) days vs. 6.20 (2.76-11.58) days, P=0.009
- No difference in the ICU LOS, hospital LOS, and ECMO duration.
- In addition, there were no differences in survival rate and incidence of chronic kidney disease in 90 days and one-year follow-up after hospital discharge.

TABLE 1: TITLE Scan to access to the full-table

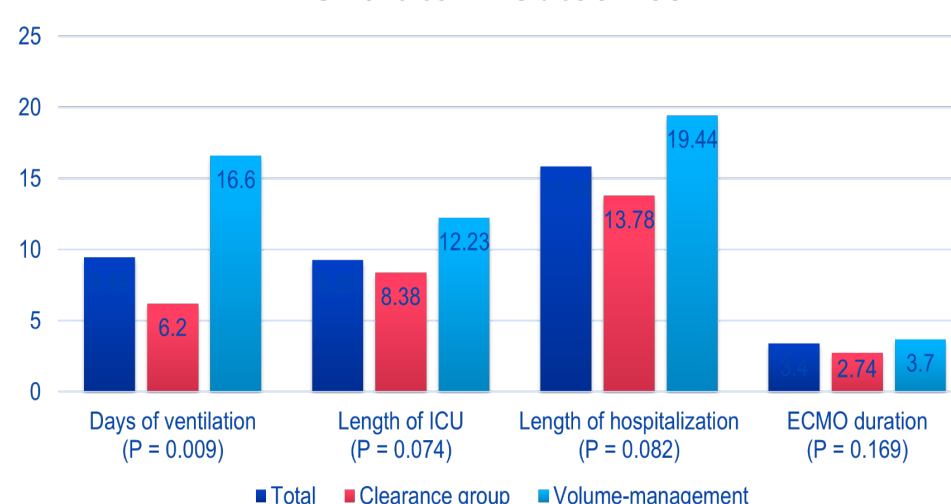


Variables	Clearance group (n=28)	Volume management group (n=28)	p, (95% C.I.)
Age, n=56, mean (SD)	68.8 (10.71)	66.26 (13.91)	0.43
Sex, n=56, no (%)	19 (65%)	16 (58%)	0.58
Male	18 (65%)	16 (58%)	0.58
Baseline creatinine, n=56, mean (SD)	0.987 (0.32)	1.15 (0.49)	0.13
CKD before hospital admission, no (%)	6 (21.4)	10 (35.7)	0.24
APACHE III score, n=56, mean (SD)	99.54 (34.84)	99.86 (32.61)	0.97
Days of ventilation (days), n=56, median (IQR)	6.20 (2.76-11.58)	16.60 (7.20-43.52)	0.009
Length of ICU (days), n=56, median (IQR)	8.38 (3.63-12.79)	12.23 (4.32-28.86)	0.074
Length of hospitalization (days), n=56, median (IQR)	13.78 (5.81-25.523)	19.44 (8.84-49.53)	0.082
ECMO duration (days), n=56, median (IQR)	2.74 (1.85-4.63)	3.7 (2.56-7.50)	0.169
CKD 90 days after hospital discharge, n=56, no. (%)	5 (17.8)	3 (10.7)	0.445
CKD 1 year after hospital discharge, n=56, no. (%)	4 (14.2)	(10.7)	0.60
Long-term dialysis, n=56, no. (%)	0 (0)	1 (3.57)	
Survival, n=56, no. (%)	11 (39.3)	7 (25)	0.252

Abbreviations: APACHE III, Acute Physiology and Chronic Health Evaluation; CKRT, continuous kidney replacement therapy; IQR, interquartile range; CKD: chronic kidney disease; ECMO extracorporeal membrane oxygenation; ICU: intensive care unite

FIGURE 1

Short-term Outcomes



DISCUSSION

- Although, fluid overload is associated with increased mortality at 30 days and 60 days among AKI patients. Among AKI patients who required RRT, hospital survivors have a remarkably lower fluid accumulation at initiation and cessation of dialysis than non-survivors, using CRRT for volume management did not make any difference in the ICU LOS, hospital LOS, and ECMO duration.
- Moreover, the use of CRRT for volume management also significantly increases the length of ventilation. Several iatrogenic complications that are related to RRT have been mentioned widely in RRT literature.
- Nutritional issues are also highlighted in critically ill patients with AKI. It is plausible that nutritional status is compromised by the depletion of important nutrients with RRT, especially in continuous therapies.

CONCLUSIONS

- Patients who received CRRT for volume management purposes are at increased risk of long MVD without improved survival rate and CKD development.
- We suggest performing a large multi-centers, blinded, randomized, controlled trial to evaluate the potential benefits of this intervention.

REFERENCES

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