Clinical factors associated with hospital mortality in critically ill adult COVID patients with AKI requiring CRRT: A multicenter study

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Introduction

- AKI is a common complication of critically ill COVID patients and is associated with adverse outcomes.
- We examined clinical factors associated with hospital mortality in critically ill adult COVID patients with AKI who required CRRT.

Methods

Study Design:

- Retrospective cohort study including data from the University of Kentucky, Lexington, KY (UKY) and Icahn School of Medicine at Mount Sinai, New York, NY (MS).

Participants:

- **Included:** Adult patients with AKI requiring CRRT (March 2020-April 2024).
- **Excluded:** Patients with ESKD or renal transplantation.

Statistical analysis:

- Univariable and multivariable Poisson regression analyses with a-priori selected covariates based on their clinical importance.
- Standardized mortality ratios (SMRs) calculated for each site (STOP COVID cohort was used to calculate expected deaths).

Results

Study Cohort

- 178 patients (mean age of 60.6 years, 68.2% men).
- Frequent use of mechanical ventilation (97.2%) and ECMO (17.4%).

Mortality

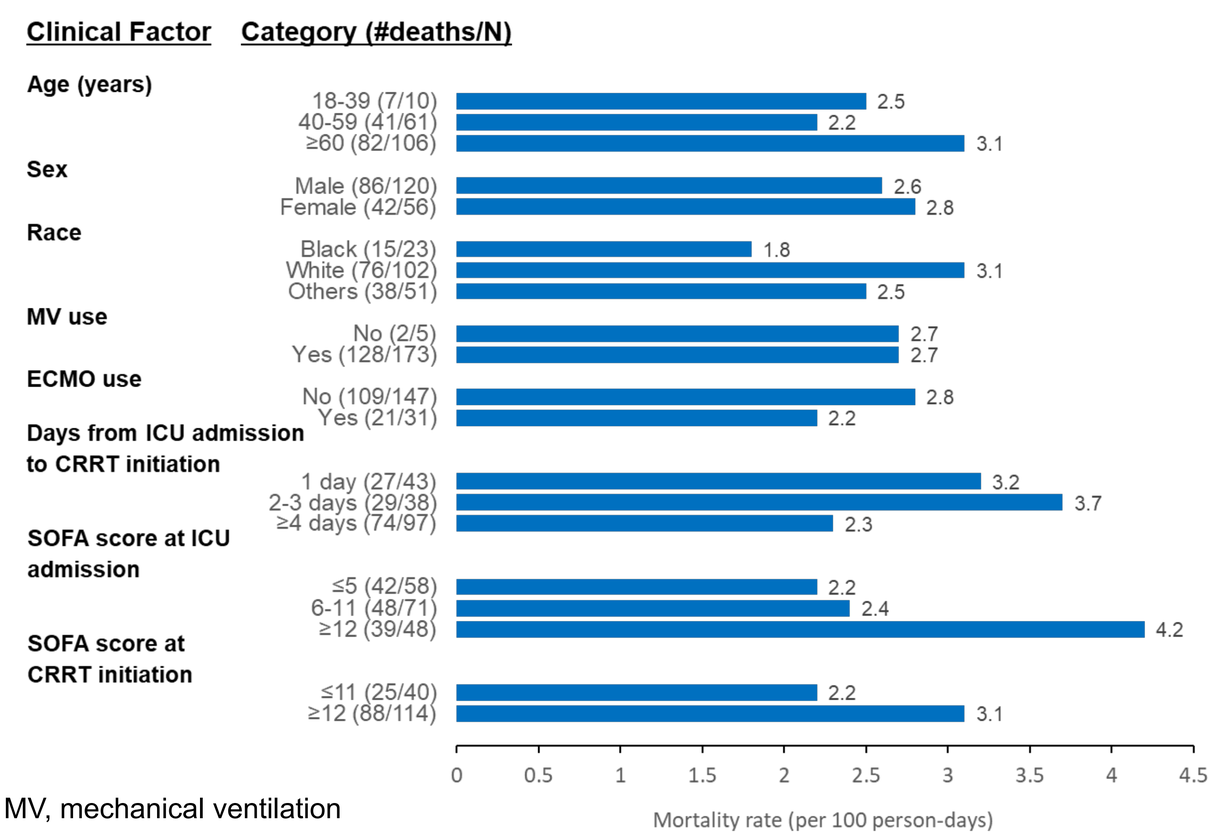
- 130 (73%) patients died (mortality rate of 2.7 per 100 person-days).
- Patients who died (vs. survived):
  - Initiated CRRT at median 4.5 (vs. 3) days from ICU admission
  - Had shorter CRRT durations: median 3 (vs. 6) days
  - Had more frequently SOFA scores ≥12 at both ICU admission: 30.2% (vs. 18.8%) and CRRT initiation: 77.9% (vs. 63.4%)
- SMRs were 1.04 and 1.15 at UKY and MS, respectively.

Poisson regression analyses examining clinical characteristics associated with hospital mortality

Clinical factor	Univariable analysis	Multivariable analysis	
	Crude MRR (95% CI)	Model 1 Adjusted MRR (95% CI)	Model 2 Adjusted MRR (95% CI)
Age (years)			
18-39	1.00	1.00	1.00
40-59	0.86 (0.72–1.03)	0.86 (0.39–1.94)	0.79 (0.35–1.81)
≥60	1.24 (1.04–1.47)*	1.25 (0.57–2.75)	1.13 (0.51–2.50)
Sex			
Male	1.00	1.00	1.00
Female	1.07 (0.99–1.16)	1.23 (0.83–1.83)	1.22 (0.83–1.81)
Race			
White/Others	1.00	1.00	1.00
Black	0.62 (0.55–0.70)*	0.56 (0.31–1.01)	0.59 (0.33–1.06)
MV use			
No	1.00	1.00	1.00
Yes	1.00 (0.73–1.37)	0.90 (0.20–3.99)	1.04 (0.24–4.59)
Days from ICU admission to CRRT initiation			
1	1.00	1.00	1.00
2-3	1.15 (1.02–1.29)*	1.37 (0.78–2.38)	1.19 (0.69–2.04)
≥4	0.72 (0.65–0.79)*	0.95 (0.58–1.57)	0.77 (0.48–1.23)
SOFA score at ICU admission			
≤5	1.00	1.00	-
6-11	1.08 (0.99–1.18)	1.23 (0.79–1.92)	-
≥12	1.90 (1.73–2.10)*	1.88 (1.17–3.01)*	-
SOFA score at CRRT initiation			
≤11	1.00	-	1.00
≥12	1.42 (1.29–1.55)*	-	1.31 (0.81–2.10)

*Statistically significant at 0.05 level.
MRR, mortality rate ratio; MV, mechanical ventilation

Hospital mortality rates (per 100 person-days) in critically ill adult COVID patients with AKI who received CRRT



MV, mechanical ventilation

Model 1 stratified by study site (Main results reported)

Clinical factor	Multivariable analysis	
	UKY Adjusted MRR (95% CI)	MS Adjusted MRR (95% CI)
Race		
White/Others	1.00	1.00
Black	0.35 (0.13–0.94)*	0.77 (0.35 – 1.72)
SOFA score at ICU admission		
≤5	1.00	-
6-11	2.02 (0.88–4.65)*	0.90(0.47–1.73)
≥12	2.87 (1.28–6.45)*	1.13(0.39–3.28)

*Statistically significant at 0.05 level.
MRR, mortality rate ratio

Conclusions

- More than two-thirds of critically ill adult COVID patients with AKI requiring CRRT died during hospitalization.
- SOFA score ≥12 at ICU admission was an independent predictor of hospital mortality, and black patients had lower risk of mortality.