Impact of Fluid overload and Continuous Renal Replacement Therapy Initiation Phenotypes on Outcomes: A retrospective analysis of the WE-ROCK Collaborative

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Introduction

- Acute kidney injury (AKI) and pathologic fluid overload (FO) are common in critically ill children and young adults.
- CRRT is used for the most severe form of AKI and FO, but there is significant practice heterogeneity across centers.
- Adult studies have not demonstrated no survival benefit for an accelerated vs. delayed strategy of of CRRT initiation.
- Whether the interaction between and time to start of CRRT is unknown

Aim and Hypothesis

- Aim: Determine if FO/CRRT start phenotypes are associated with 90-day mortality
- Hypothesis: Patients with FO>10% and late CRRT start (>48h) will have worse 90-day mortality compared to early start and no FO.

Methods and Materials

- Multi-center retrospective study.
 - 32 Centers, 7 nations
- Inclusion: Patients aged 0-25 years treated with CRRT for AKI, and/or FO from 2015-2021.
- Exclusion: ESKD, non-AKI/FO indication, concurrent ECMO or use of PD in the same admission prior to CRRT, use of CARPEDIEM™ device.
- Primary Exposure: Patients were delineated into 4 phenotypes of FO at CRRT start (<10% vs. ≥10%) and timing of CRRT initiation from ICU admission (early, ≤48 hours vs late: >48 hours).
- Primary Outcomes: 90-Day mortality
- Secondary outcomes: ICU LOS
- Analysis: Multivariable regression was used to determined associations with outcomes.

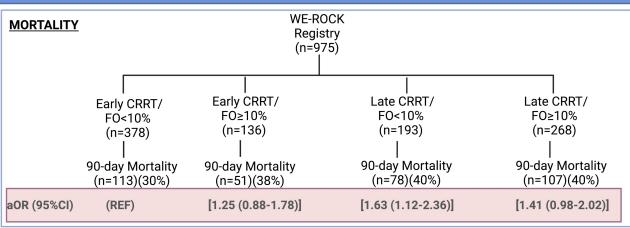
Conclusions

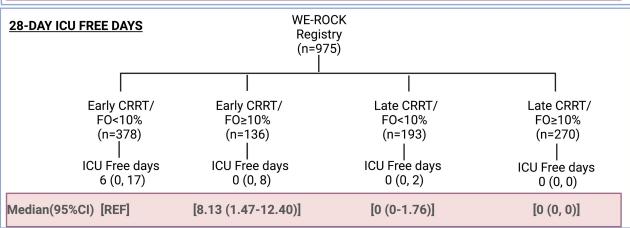
- Late CRRT start, independent of FO conferred the greatest risk of 90-day mortality and increased resource utilization
- RCT's are needed to determine whether early vs.
 Late start with fluid thresholds impact mortality

Results

Comparison of Start and Fluid Phenotypes					
Variable	Early/FO<10% (n=378)	Early/FO≥10% (n=136)	Late/FO<10% (n=193)	Late/≥10% (n=268)	P-Value
Age (years)	10.63 (2.83, 15.95)	3.57 (0.93, 10.6)	13 (5.67 <i>,</i> 16.57)	3.66 (0.83, 12.92)	<0.001
Sepsis at ICU admission	146 (39)	82 (60)	83 (43)	135 (50)	<0.001
1` ComorbidityNoneRespiratoryCardiacOncologicImmunolog	88 (23) 39 (10) 42 (11) 91 (24) 67 (18)	31 (23) 16 (12) 18 (13) 30 (22) 20 (15)	28 (15) 28 (15) 51 (26) 50 (26) 31 (16)	45 (17) 48 (18) 79 (29) 50 (19) 35 (13)	0.03 0.04 <0.001 0.3 0.4
PELOD-2 at CRRT initiation	6 (3, 9)	8 (6, 11)	6 (4, 8)	7 (5, 10)	<0.001
VIS at CRRT start	0 (0, 15)	19 (0, 38)	3 (0, 11.5)	5 (0, 17)	<0.001
%FO at CRRT initiation	2.64 (0.51, 5.72)	15.09 (12.07, 24.61)	3.78 (0.93, 6.96)	26.23 (16.57, 41.58)	<0.001
CRRT duration (days)	5 (2, 12)	7 (3, 13)	7 (3, 16)	7 (4, 17)	<0.001
ICU LOS	15 (8, 24)	22 (14, 31)	28 (16, 54)	41 (22, 68)	<0.001
90-day Mortality	117 (31)	56 (41)	85 (44)	108 (40)	0.007

Multivariable Associations with Outcomes







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