“Better Early, Late, or Never? Continuous Renal Replacement for Rhabdomyolysis Induced Acute Kidney Injury”

Poster #42

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BACKGROUND

Continuous renal replacement therapy (CRRT) has been used for the treatment of rhabdomyolysis induced renal failure; however, timing of initiation has not been consistently demonstrated to change mortality and thus is a focus of our study.

METHODS

A retrospective, case-control study, included all trauma patients over a 5 year period who were coded for rhabdomyolysis. Those with a creatinine kinase that exceeding 5,000 IU/L were analyzed based on timing of CRRT, mortality, length of stay, and trends in biomarkers.

RESULTS

Of 369 patients with rhabdomyolysis, 48 (13%) received CRRT (cases). Cases were matched in a 1:4 ratio with 194 control patients who did not receive CRRT. The mean ISS in CRRT group was 29.4 (standard deviation,SD,15.4) compared to 25.9 (SD13.2) in the control. The ICU length of stay (35.3 days vs 15.5, SD 22.2 vs 12.3, P<0.0001) and overall length of stay (26.4 days vs 9.8, SD 27.9 vs 13.5, P<0.0001) was higher in the CRRT verses control group.

Mortality was higher in the CRRT group (33.3% vs 9.8%, P<0.0001) predominantly within the first 24 hours (17%). 35.4% of the CRRT group were discharged or died on CRRT. Only ISS was an independent risk factor for death, regardless of CRRT (OR 1.06, CI 1.03-1.10, P<0.0001). The unadjusted risk factor for death between cases and controls was higher in CRRT (OR 4.61, CI 2.1-9.89).

In the CRRT group, BUN peak (67.5 vs 25.5, P<0.0001), creatinine peak (3.88 vs 1.73, P<0.0001), and peak K+ (6.2 vs 5.0, P<0.0001) were all statistically significantly higher compared to controls. The base deficit peak (-9.6 vs +2.8, P<0.0001), creatinine kinase peak (55087 vs12557, P<0.0001), and peak myoglobin (60605 vs 6401, P<0.0001) were all significantly higher in the CRRT group.

Of those requiring CRRT, early verses late initiation of CRRT showed no difference in length of stay, mortality, duration of CRRT, or HD requirement at discharge.

TABLE 1

Demographics and unadjusted outcomes.

	Cases (N=48)	Controls (N=194)	P-value
Demographics			
Age (SD)	40 (15.4)	40.3 (15.1)	0.92
Sex (%)			
Male	46 (95.8)	9 (4.6)	
Female	2 (4.2)	185 (95.4)	0.06
ISS (SD)	29.4 (15.4)	25.9 (13.2)	0.17
Mechanism of Injury (%)			
Crush	3 (6.3)	2 (1.3)	
Blunt	37 (77)	163 (84)	
Penetrating	5 (10.4)	20 (10.3)	
Other *	3 (6.3)	9 (4.4)	0.08
Fluid Balance			
24 Hour Intake (SD)	13,279 (11,349)	9,022 (7453)	0.02
24 Hour Output (SD)	4,866 (6,816)	3,500 (2,964)	0.19
Outcomes			
Length of stay (days, SD)	35.3 (27.9)	15.5 (13.5)	<0.0001
ICU Length of stay (days, SD)	26.4 (22.2)	9.8 (12.3)	<0.0001
Mortality (%)	16 (33.3)	19 (9.8)	<0.0001
Discharged with Dialysis Requirement	17 (35.4)	*	--

*Data not available for controls

TABLE 2

Outcomes among patients requiring CRRT, stratified by early (<24 hours) vs. late (>24 hours) initiation of CRRT.

	Early (N=21)	Late (N=27)	P-Value
Mortality (n,%)	8 (38.1)	8 (29.6)	0.54
Total length of stay (mean days, SD)	31.4 (27.8)	38.3 (27.8)	0.40
ICU length of stay (mean days, SD)	24.7 (22.2)	27.7 (22.5)	0.64
Dialysis requirement at time of discharge (n, %)	8 (38)	9 (33.3)	0.73

CONCLUSIONS

Patients who received CRRT were more critically ill, had greater elevation of serum markers for acute kidney injury (AKI), and a higher severity of rhabdomyolysis compared to controls. The initiation of CRRT may predict higher mortality and length of stay in AKI. In this cohort, timing of CRRT did not change mortality, outcome, or duration on CRRT. There was only a small percentage of those patients who received CRRT and needed continued dialysis. Dosing, setting, and technical aspects pertaining to CRRT may contribute to outcome. Larger prospective studies are indicated to determine efficacy and timing of CRRT.