Demographics, Indications, and Outcomes of Continuous Kidney Replacement Therapy in Critically Ill Children: A Single-Center Experience from Thailand

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Background: Continuous kidney replacement therapy (CKRT) is widely used in critically ill patients with acute kidney injury (AKI) with various outcomes. Sepsis and percentage of fluid overload have been associated with poor prognosis.

Methods: We conducted a single-center, retrospective cohort study of children aged < 18 years old with AKI requiring CKRT from 2017 to 2024 to describe demographics, indications, methods, short- and long-term outcome. Subgroup analysis based on sepsis and fluid overload were performed. Multivariate logistic regression was used to identify predictors of mortality.

Results: A total of 27 patients (median age 7.2 years) were included. Main indications were from fluid overload (85.2%) and the most common mode was continuous venovenous hemofiltration (CVVH) (92.6%). The median duration was 4 days with dose of 30 ml/kg/hr. 18 patients (66.7%) had sepsis at CKRT initiation. **The in-hospital mortality rate was 77.8%.**

Outcomes in children receiving CKRT with sepsis and those without sepsis

Variable	All (n=27)	Sepsis (n=18)	Without sepsis (n=9)	p-value
Duration of CKRT, day	4 (2-6)	2 (2-6)	6 (2-10)	0.19
ICU length of stay, day	11 (6-17)	13 (5.8-17)	7 (6-22)	0.737
Hospital length of stay, day	15 (10-35)	20 (11.5-56.3)	11 (6.5-25)	0.089
Ventilator day, day	9 (5-13)	10.5 (5-13.3)	7 (5.5-15)	0.918
In-hospital mortality, n (%)	21 (77.8)	15 (83.3)	6 (66.7)	0.326

Outcomes in children receiving CKRT with percentage of fluid overload

Variable	All (n=27)	%FO < 10 (n=16)	%FO ⩾10 (n=11)	p-value
Duration of CKRT, day	4 (2-6)	2.5 (2-6)	5 (2-11)	0.315
ICU length of stay, day	11 (6-17)	11 (7-16.3)	14 (5-25)	0.98
Hospital length of stay, day	15 (10-35)	19.5 (10.3-46.3)	15 (5-33)	0.415
Ventilator day, day	9 (5-13)	9 (6-12.5)	9 (5-15)	0.961
In-hospital mortality, n (%)	21 (77.8)	11 (68.8)	10 (90.9)	0.174

Subgroup analysis of sepsis and fluid overload with outcome of the patients were not statistically significant. However, there was some trending towards significance in sepsis and hospital length of stays (p-value 0.089) and in patients with high fluid overload (⩾ 10%) and mortality (p-value 0.174). No factor was significantly associated with mortality in multivariate analysis.

Univariate and multivariate analysis examining the association between demographic and clinical variables and mortality in children requiring CKRT

Variable	Univariate analysis		Multivariate analysis	
	Crude odd ratio (95% CI)	p-value	Adjusted odd ratio (95% CI)	p-value
Age	1.12 (0.94-1.34)	0.197	1.15 (0.84-1.57)	0.374
Sex Male Female	0.15 (0.02-1.52) Ref	0.108	0.14 (0.01-1.99) Ref	0.147
BW	1.01 (0.96-1.05)	0.818	0.97 (0.90-1.05)	0.465
Admission dx Cardiac Infectious	Ref 1.43 (0.85-2.43)	0.17	Ref 1.31 (0.45-3.80)	0.618
Sepsis Yes No	2.50 (0.39-16.05) Ref	0.334	2.34 (0.12-45.39) Ref	0.575
ECMO Yes No	0.33 (0.03-3.31) Ref	0.342	0.65 (0.04-10.93) Ref	0.768
Percentage of FO	0.93 (0.80-1.07)	0.289	0.95 (0.79-1.14)	0.552
Postop cardiac sx Yes No	1.82 (0.27-12.17) Ref	0.538	1.97 (0.08-50.41) Ref	0.682

Conclusion: Critically ill children with AKI requiring CKRT have **high mortality**. Although not statistically significant, **sepsis and fluid overload** showed a trend toward worse outcomes, suggesting the need for early recognition and management.

Keywords: Acute kidney injury, Continuous kidney replacement therapy, Pediatrics

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