

MORTALITY ASSOCIATED TO THE SEVERITY OF AKI USING pRIFLE CRITERIA AT INITIATION OF RENAL REPLACEMENT THERAPY (IN CRITICALLY ILL CHILDREN)

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Background

- The high mortality and morbidity in critically ill children treated with renal replacement therapy (RRT) are multifactorial.
- Pediatric RIFLE** criteria is a score adapted from the adult RIFLE criteria for characterization and stratification of acute kidney injury (AKI) severity based on GFR change and urine output and includes 5 stages (**R**isk, **I**njury, **F**ailure, **L**oss, **E**nd Stage).
- The utility of pRIFLE criteria for the diagnosis and prognosis of AKI in a pediatric population has been well described.
- However, the role of pRIFLE criteria measured at RRT initiation remains largely unknown.

Objectives

- Evaluate the association between the severity of AKI at RRT initiation using the pRIFLE criteria and patient mortality and morbidity.

Methods

- Retrospective, single center, observational study at a pediatric intensive care unit (PICU) in Geneva, Switzerland (Hôpitaux Universitaires de Genève, tertiary center).
- Population:** Pediatric patients treated with RRT in PICU between 2008 and 2018.

Results

- 94 patients met inclusion criteria. (Table 1)

Table 1. Demographic characteristics by pRIFLE AKI Stage

	ALL	AKI defined by pRIFLE criteria				p
		NO AKI	RISK	INJURY	FAILURE	
N (%)	94	12(12.8)	7(8.6)	11(13.6)	63(77.8)	
Male n(%)	49(52.1)	7(58.3)	4(57.1)	7(63.6)	30(47.6)	0.579
Age, months old (IQR)	29 (7-113.3)	13(4-66.3)	55(32.5-104.5)	25(8.5-45.5)	35(7.5-139)	0.633
Weight, Kg (IQR)	12.1(6.2-25.5)	8(5.3-18.1)	14.1(10.1-22.3)	12.8(6.2-15)	13(7-29.5)	0.676
PRISM IV (IQR)	4(2-13)	9(4.5-26.8)	6(3-8.5)	2(1-7.5)	4(1.8-13)	0.676
PELOD at initiation of RRT (IQR)	22 (13-33)	21(12-32)	13(12.5-23)	31(22.5-36.5)	23(18.3-34.8)	0.294
Mechanical ventilation n(%)	58(62.8)	6(50)	5(71.5)	10(90-9)	58.7)	0.111
Inotrope/vasopressors n(%)	61(64.9)	10(83.3)	4(57)	8(72.7)	39(61.9)	0.748
ECMO n(%)	38(40.4)	9(75)	4(57.1)	6(54.5)	19(30)	0.139

- 12.8% had no AKI and 86.2% had AKI according to the pRIFLE criteria at RRT initiation.
- Overall mortality was 45.7%.
- The mortality in the AKI subpopulation was 44.4% and there was no significant difference between AKI severity at RRT initiation (Table 2) or morbidity (PICU lengths of stay, time on mechanical ventilation).

Table 2. pRIFLE score at initiation of RRT and secondary outcomes

Outcome	AKI defined by pRIFLE criteria				
	No AKI N= 12	RISK N= 7	INJURY N= 11	FAILURE N= 63	p
Mortality (%)	7 (58.3%)	1(14.3%)	5(45.5%)	30(47.6%)	0.242
RRT length (hours)	51 (23-145)	112(90.5-132.5)	88 (78.5-145.5)	126.5 (48-235.5)	0.815
Length of stay in ICU (IQR)	17.5 (8.2-39.5)	14 (12.3-15.8)	12.5 (9.3-24.3)	11.5 (6-21.8)	0.709
Ventilation days (IQR)	9 (2.5-17.5)	10.5 (4.5-12.8)	7 (3-17)	6 (2-12)	0.428
Inotropes days (IQR)	8(2.8-115.5)	3 (2.3-9.8)	7 (4-10)	4 (1.5-7)	0.296

- The distribution according to the pRIFLE criteria was similar among survivors and non-survivors with a majority of children in the stage "F" (69% in the non-survivor and 64% in survivors groups).
- Time spent in stage "F" has no effect on mortality (46% mortality if < 24 hours vs 50% if > 24 hours).
- In multivariable logistic regression analysis, factors associated with mortality at RRT initiation included diagnosis of non-surgical cardiac disease (OR 16.73, 1.6-174.4), elevated PELOD score (OR 1.076, 1.031-1.124) and elevated fluid balance (OR 1.006; 1.001-1.012).

Conclusions

- Most of the patients requiring RRT were in stage "F".
- Neither the severity of AKI according to the pRIFLE nor the duration in stage "F" prior to RRT initiation predicted mortality or morbidity.
- Factors associated with increased mortality were severity of illness (PELOD score), diagnosis of a non-surgical cardiac disease, and fluid balance.

Implications

- Prospective studies are needed to confirm the absence of significant difference of AKI severity in RRT initiation on outcomes.

References

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