



# SHORT-TERM OUTCOMES OF PATIENTS WITH SEVERE ACUTE KIDNEY INJURY IN AN INTENSIVE CARE UNIT OF A LOW-MIDDLE INCOME COUNTRY

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## INTRODUCTION

Severe acute kidney injury (AKI) is associated with substantial short-term and long-term mortality. While extensively described in developed countries, the short-term and long-term outcomes of severe AKI, particularly AKI required renal replacement therapy (RRT), have not been well reported in resource-limited countries. The aim of this study was to evaluate the short-term outcomes of severe AKI and the impacts of RRT modalities on mortality in a low-middle income country.

## METHODS

This was a prospective observational study conducted in two intensive care units of a tertiary hospital from 7/2019 to 7/2021 in Viet Nam. All severe AKI patients (according to KDIGO criteria) who were older than 18 years old and admitted to the intensive care units were enrolled and monitored until discharge, then followed up every 3-month. The baseline serum creatinine was the most recent available serum creatinine before hospital admission within one year or was estimated by using the lower value between the serum creatinine at the time of hospital admission or the back calculation of serum creatinine from the Modification on Diet in Renal Disease (MDRD) equation with a GFR of 75 ml/min/1.73 m<sup>2</sup>. We performed multivariate Cox regression analysis to identify the independent factors associated with mortality. The Kaplan-Meier method was used to estimate the overall survival probability, stratified by modalities of RRT.

## RESULTS

A total of 308 patients were included, 61% of the patients were male. 87 patients were lost to follow up at 6-month. 281 patients (91.2%) were treated with RRT, and 81/281 patients (28.8%) were switched from initial mode to another mode of RRT. Among 233 patients initially treated with CRRT, 37 (25%) and 25 (11%) patients were switched to IHD and SLED, respectively. Among 40 patients initially treated with IHD, 10 (25%) and 3 (7.5%) patients were switched to CRRT and SLED, respectively.

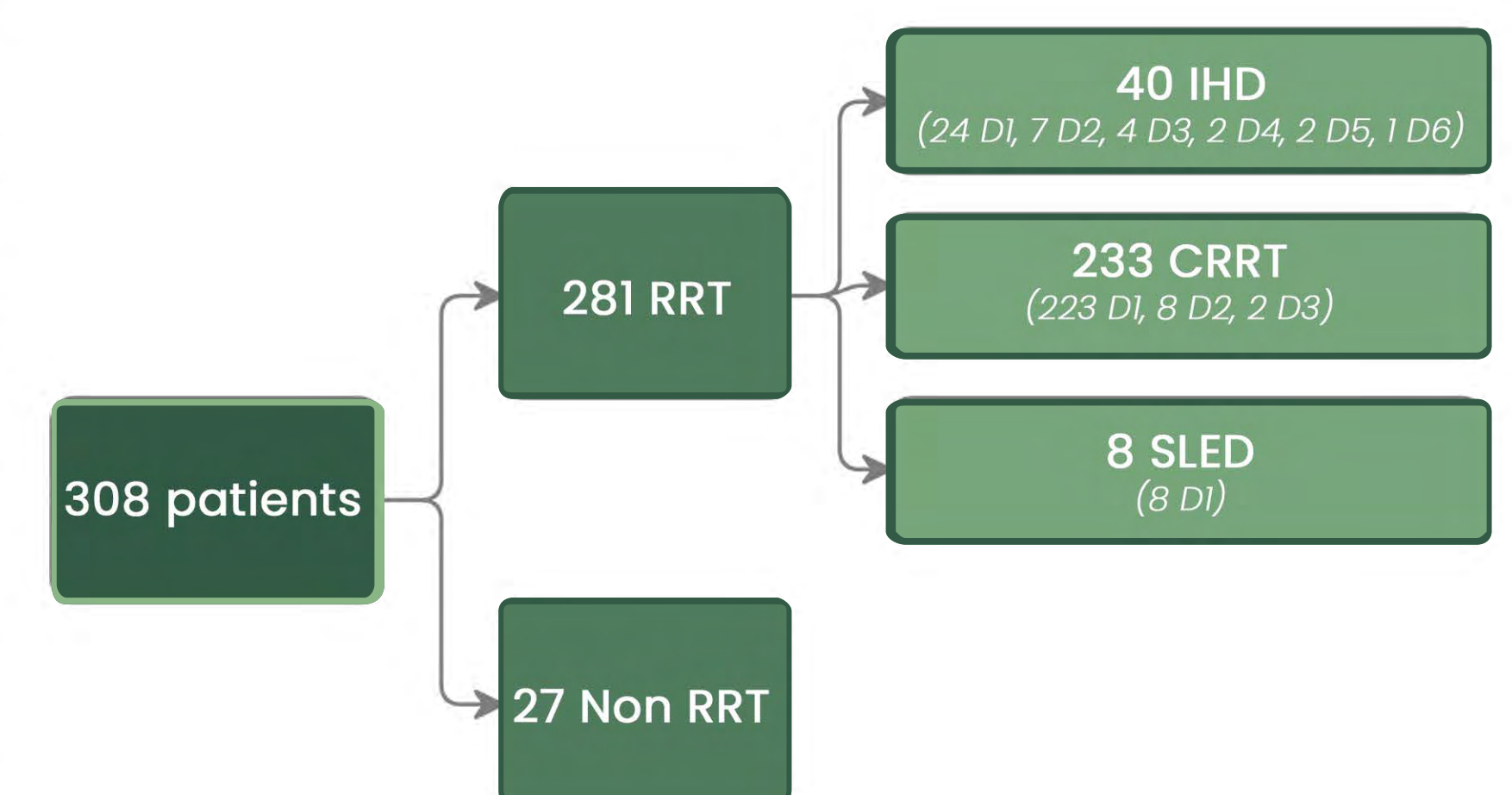


Figure 1. Patients flow chart by RRT status and first modality (D1-D28)

The eGFRs at enrollment in IHD (14.2 ml/min/1.73 m<sup>2</sup>) and SLED (17.4 ml/min/1.73 m<sup>2</sup>) group were lower than that of CRRT (22 ml/min/1.73 m<sup>2</sup>) group (p=0.001). APACHE II and SOFA score in CRRT (25±8 and 12±4, respectively) and SLED (25±7 and 11±3, respectively) group were higher than those in IHD (20±6 and 9±3, respectively) group (p<0.001). The majority of patients (85%) in CRRT group were treated with vasopressor within 28 days. Hospital LOS in survived patients was shorter in CRRT group (20 days) compared to those in IHD (29 days) and SLED (29 days) group (p=0.01). The mortality rates at hospital discharge and at 6-month were 34% and 60%, respectively. There were no significant differences in the 6-month mortality amongst the patients initially treated with CRRT, IHD or SLED (p=0.324). Surgery as a cause of ICU admission [HR 2,14 (1,4 – 3,29), p<0.001], septic AKI [HR 1,93 (1,15-3,23), p=0,013] and vasopressor treatment in 28 days [2,73 (1,37-5,44), p=0.004] were independently associated with 6-month mortality.

Figure 2. Kaplan-Meier plot of time to dead at day 180

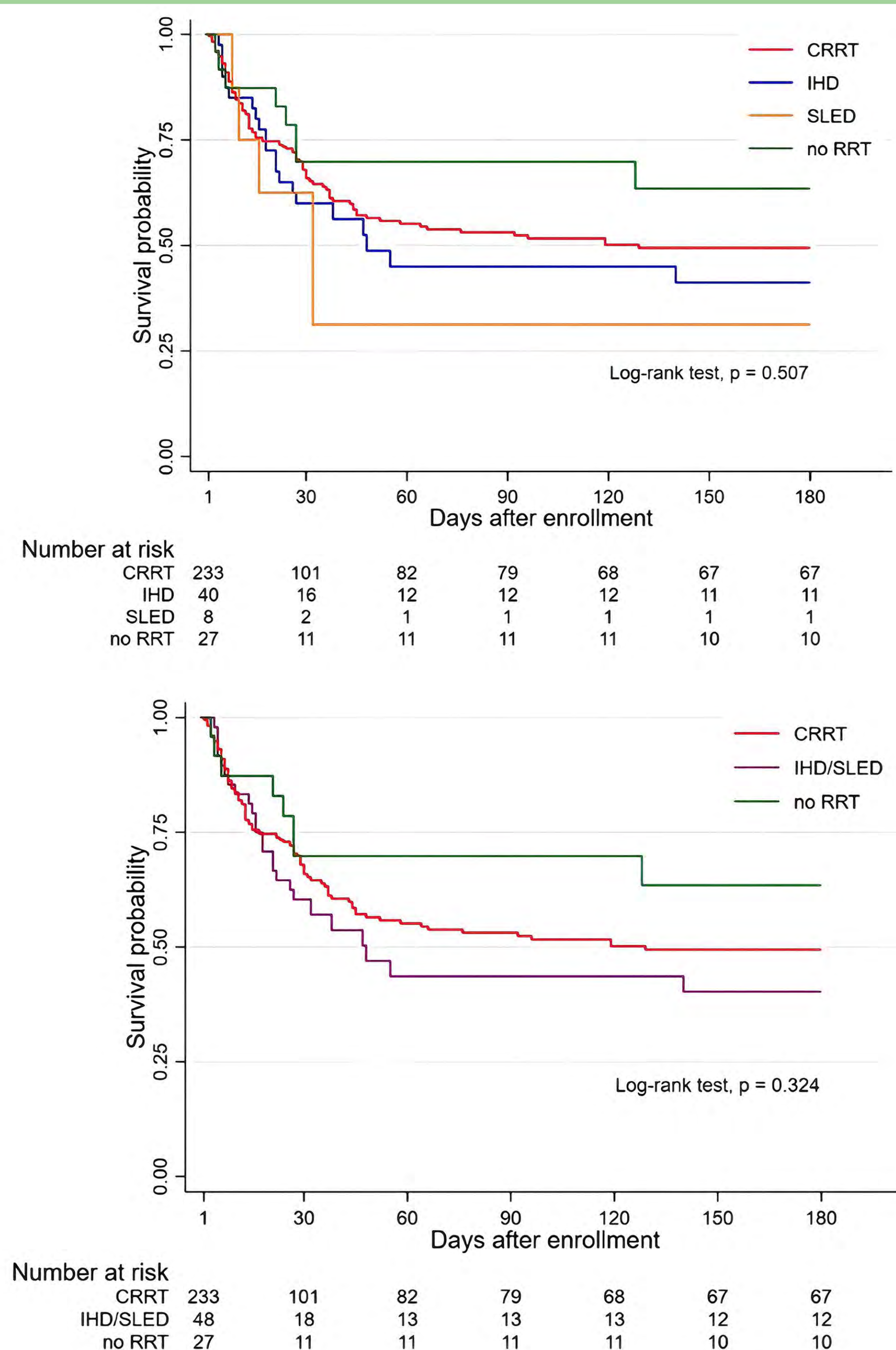


Table 1. Univariate and multivariate analysis of potential risk factors for mortality at 6 months (N=308).

Characteristics	Univariate analysis		Multivariable analysis	
	HR (95% CI)	P-value	Adjusted HR (95% CI)	P-value
Surgical causes of admission	2.01 (1.37, 2.97)	<b>&lt;0.001</b>	2.14 (1.40, 3.29)	<b>&lt;0.001</b>
Chronic coronary disease	2.01 (1.10, 3.65)	<b>0.022</b>	0.97 (0.49, 1.80)	0.816
Septic AKI	2.74 (1.72, 4.37)	<b>&lt;0.001</b>	1.93 (1.15, 3.23)	<b>0.013</b>
APACHE II	1.04 (1.01, 1.06)	<b>0.002</b>	1.01 (0.98, 1.04)	0.566
SOFA	1.06 (1.01, 1.10)	<b>0.008</b>	0.99 (0.93, 1.05)	0.64
<b>Laboratory test at day 1</b>				
Creatinine	0.99 (0.92, 1.07)	0.824		
eGFR	0.99 (0.98, 1.00)	0.061		
BUN	1.01 (1.00, 1.01)	<b>0.026</b>	1.00 (0.99, 1.01)	0.742
Sodium	1.03 (1.01, 1.05)	<b>0.008</b>	1.00 (0.97, 1.03)	0.818
Fluid balance at day1	1.00 (1.00, 1.00)	0.823		
Vasopressor in 28 days	2.70 (1.58, 4.63)	<b>&lt;0.001</b>	2.73 (1.37, 5.44)	<b>0.004</b>

## CONCLUSIONS

Our study demonstrates that severe AKI in the ICU is associated with worsen 6-month mortality. While surgery, septic AKI, and vasopressor treatment are independent factors of death, initial modalities of RRT do not change patients' survival rate.

## KEYWORDS

Acute kidney injury, renal replacement therapy, intensive care unit, short-term outcome.