

# Risk factors for the development of persistent acute kidney injury in critically ill patients. A retrospective analysis



Juan Toro MD<sup>1</sup>, Priyanka Priyanka MPH<sup>1</sup>, Ankit Sakhuja MD<sup>1,2</sup>, Natsumi Hamahata MD<sup>1</sup>, John A. Kellum MD<sup>1,3</sup>, Hernando Gómez MD, MPH<sup>1</sup>

<sup>1</sup>Program for Critical Care Nephrology, Clinical Research, Investigation, and Systems Modeling of Acute Illness (CRISMA) Center, Department of Critical Care Medicine, University of Pittsburgh, Pittsburgh, PA, USA. <sup>2</sup>Section of Cardiovascular Critical Care, Department of Cardiovascular and Thoracic Surgery, West Virginia University, Morgantown, WV, USA.

## Introduction

- Acute kidney injury (AKI) is a frequent complication in critically ill patients.
- Failure to recover from AKI beyond 72h (persistent AKI) is associated with worse outcomes.
- Identification of risk factors will facilitate a timely response to prevent this affliction.
- However, the occurrence of persistent AKI in critically ill patients and its risk factors are not well established.

## Aims

- To describe the occurrence of persistent AKI in critically ill patients in a large healthcare system in the U.S.
- To define the association between persistent AKI and mortality, and to identify the risk factors associated with persistent AKI.

## Methods

**Design:** Retrospective study using the High-Density Intensive Care (HiDenIC) database.

**Patients:** Adult (>18 years) critically ill patients admitted to the ICU from October 2008 to December 2014.

**Intervention:** None

**Definitions:**

- Severe AKI** defined as KDIGO criteria stage 2 or 3.
- Persistent AKI** defined as the composite of *i.* persistent AKI stage 3 for ≥72h, *ii.* dialysis, or *iii.* Death following stage 3 AKI.
- Transient AKI** defined as AKI stage 2-3 that does not meet criteria for Persistent AKI.

**Outcomes:**

**Primary:**

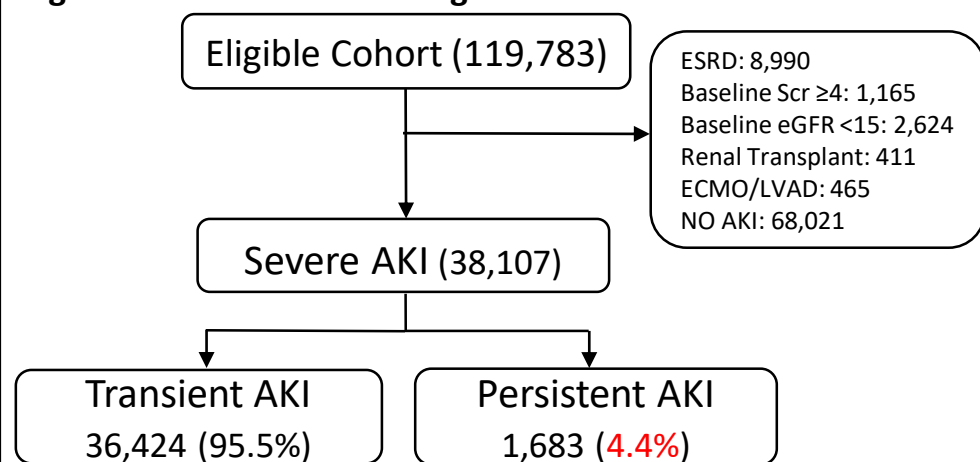
- Aim 1: Occurrence of Persistent AKI.
- Aim 2: 90-day mortality.

**Secondary:**

- Major adverse kidney events at 90 days (MAKE90).
- Occurrence of Severe AKI and Transient AKI.

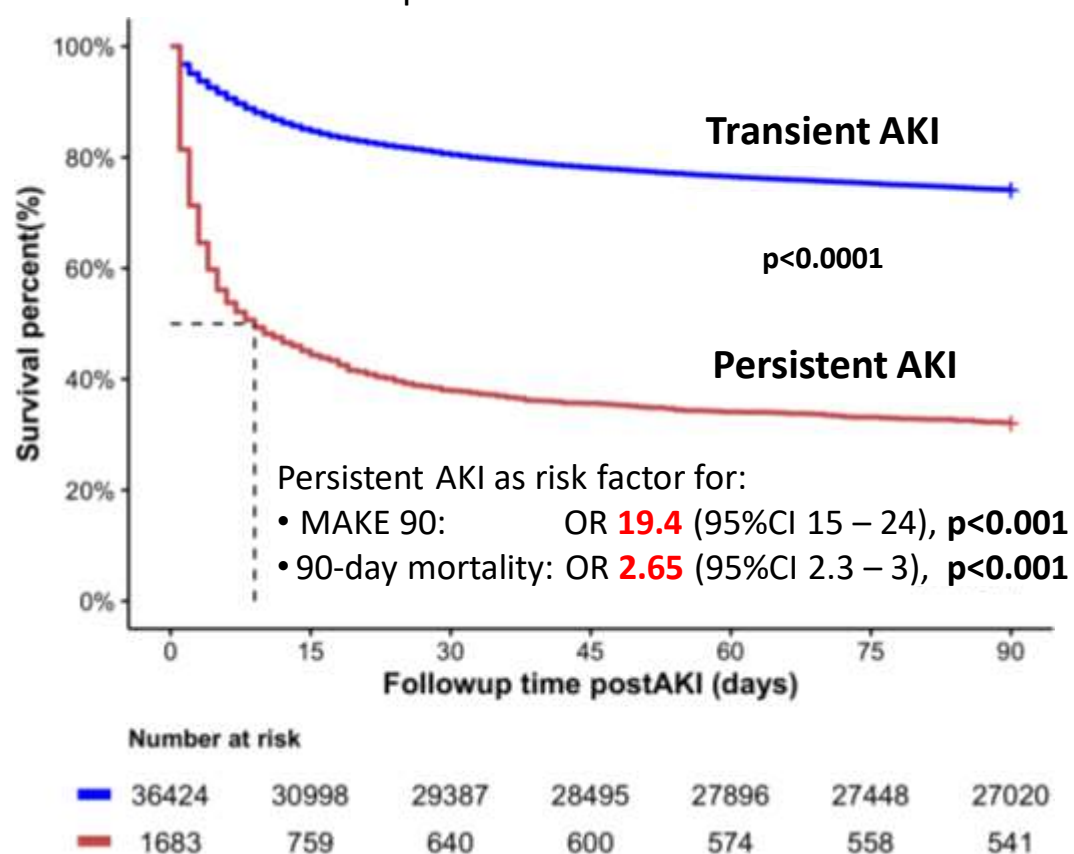
## Results

**Figure 1. CONSORT flow-diagram.**



## Results

**Figure 2.** Kaplan-Meier curve comparing 90-day survival between patients with transient and persistent AKI.



**Table 1.** Multivariate logistic regression of risk factors for **Persistent AKI**.

RISK FACTORS	OR	P-value	95% CI	
Age	0.97	<0.001	0.96	0.97
Female	1.01	0.88	0.9	1.13
Black	0.88	0.21	0.72	1.07
Baseline Creatinine	2.05	<0.001	1.85	2.28
Last Creatinine 90 days	1	0.6	1	1
Apache_72H pre-AKI	1.06	<0.001	1.06	1.06
SoFa_72H pre-AKI	1.05	<0.001	1.03	1.06
Charlson Score				
2-4	1.41	<0.001	1.24	1.62
4-6	1.51	<0.001	1.29	1.78
>6	1.32	0.01	1.07	1.63

**AUC ROC: 89.20%** (95%CI 0.88 – 0.90)

## Conclusions

- Persistent AKI occurred in 4.4% of Severe AKI patients and 1.4% of all critically ill patients.
- Persistent AKI is associated with almost a 3-fold increase in 90-day mortality and nearly a 20-fold increase in MAKE90.
- Timely interventions to prevent persistent AKI may decrease morbidity and mortality, particularly in critically ill patients with worse baseline creatinine and multiple comorbidities.

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