DICAM is a prognostic indicator for mortality in critically ill patients with acute kidney injury requiring CKRT: a multicenter cohort study

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Introduction

- Acute kidney injury (AKI) is a common complication in critically ill patients, and its association with increased mortality underscores the need for reliable prognostic markers.
- This study investigated the potential of dual immunoglobulin domain-containing cell adhesion molecule (DICAM), an inflammation-associated transmembrane protein, as a mortality prediction indicator in critically ill AKI patients requiring continuous kidney replacement therapy (CKRT).

Methods and Materials

- This is a prospective multicenter cohort study conducted involving critically ill patients with AKI who required CKRT.
- Blood samples were collected prior to CKRT initiation on the day of CKRT and were available for 112 patients.
- The primary outcome was in-hospital mortality and the association was analyzed using Cox regression analysis, applying DICAM as both a dichotomous and continuous variable.

Results

- The mean age was 65.7 ± 14.8 years and the median DICAM level was 13.8 ng/dL (the median level was 7.5 ng/dL in healthy control)
- The high DICAM group showed significantly higher in-hospital mortality compared to the low DICAM group (adjusted HR, 2.05, 95% CI, 1.11–3.76, *P* = 0.021). In addition, DICAM, analyzed as a continuous variable, demonstrated a significant association with a mortality rate (adjusted HR, 1.02, 95% CI, 1.01–1.03, *P* = 0.001).
- The predictive power (AUC) of DICAM for mortality was higher (AUC: 0.729) compared to other classical prognostic markers such as APACHE II (0.557) and SOFA (0.580) scores, albumin (0.559), NGAL (0.595), and GDF-15 (0.554).
- DICAM was positively correlated with SOFA score, NGAL, GDF-15, and serum lactate level.

Table 1. Baseline characteristics

Variables	All (n=115)	Low DICAM (n=57)	High DICAM(n=58)	*P*
Age, y	65.7 ± 14.8	65.2 ± 13.9	66.2 ± 15.8	0.720
Sex, male, n (%)	88 (76.5)	50 (87.7)	38 (65.5)	**0.005**
Cause of AKI				
Septic	61 (53.0)	26 (45.6)	35 (60.3)	0.115
Ischemic	21 (18.3)	9 (15.8)	12 (20.7)	0.630
Post-op	7 (6.1)	6 (10.5)	1 (1.7)	0.061
Others	26 (22.6)	16 (28.1)	10 (17.2)	0.187
Hypertension	55 (47.8)	31 (54.4)	24 (41.4)	0.163
Diabetes	49 (42.6)	27 (47.4)	22 (37.9)	0.306
CCI	3.0 (2.0-4.0)	3.0 (2.0-4.0)	3.0 (2.0-4.0)	0.796
SOFA score	10.5 ± 3.6	10.2 ± 3.7	10.8 ± 3.6	0.326
APACHE II	30.8 ± 10.0	27.6 ± 10.0	33.8 ± 9.1	**0.001**
DICAM, ng/mL	13.8 (6.9-33.5)	6.9 (5.0-9.7)	31.4 (17.0-64.0)	**<0.001**
NGAL, ng/mL	202.2 (104.0-373.7)	187.5 (97.2-277.5)	256.5 (150.2-488.6)	**0.016**
GDF-15, pg/mL	6538.1 ± 2360.5	5661.7 ± 2253.3	7343.8 ± 2193.7	**<0.001**

Table 2. Association between DICAM and in-hospital mortality in Cox proportional hazards model

	Model 1		Model 2	
Variables	aHR (95% CI)	P	aHR (95% CI)	P
High DICAM (categorical variable)	2.29 (1.28-4.13)	0.006	2.05 (1.11-3.76)	**0.021**
DICAM, ng/dL (continuous variable)	1.02 (1.01-1.03)	<0.001	1.02 (1.01-1.03)	**0.001**

Model 1: adjusted for age, sex, mCCI, DM, and HTN.

Model 2: adjusted for age, sex, mCCI, DM, HTN, septic AKI, APACHE II score, and vasopressor use.

Figure 1. Kaplan-Meier curve for in-hospital mortality in the DICAM dichotomous groups

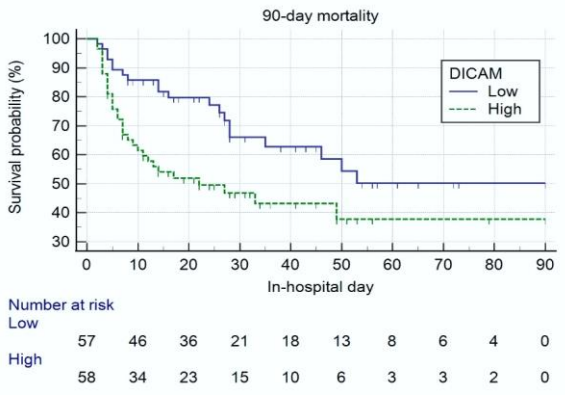
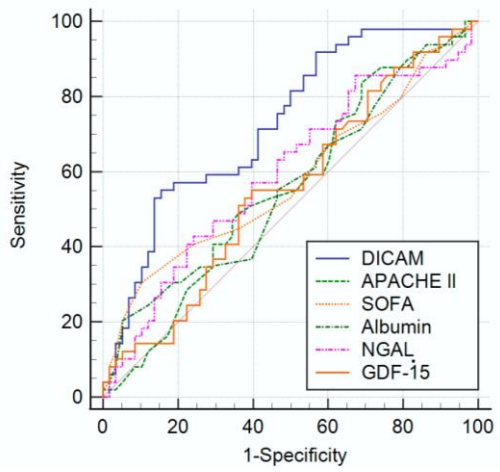


Figure 2. ROC curves of prognostic predictors for in-hospital mortality



The AUC values are as follows: DICAM (0.729); APACHE II (0.557); SOFA (0.580); albumin (0.559); NGAL (0.595); GDF-15 (0.554)

Table 3. Associated factors for DICAM in linear regression analysis

	All patients (n=115)	
Variables	**r**	***P***
Age	−0.025	0.792
mCCI	0.024	0.795
APACHE II score	0.170	0.070
SOFA score	0.216	**0.021**
NGAL	0.321	**<0.001**
GDF-15	0.284	**0.002**
Albumin	−0.086	0.376
hs-CRP	0.054	0.606
Lactate	0.283	**0.026**
PT INR	0.074	0.456

Conclusions

- Elevated DICAM levels are independently correlated with an increased risk of in-hospital mortality among critically ill patients with AKI requiring CKRT.
- DICAM may be a valuable prognostic marker in this population. Further research is required to unravel the underlying mechanisms and validate these findings.