



Shaping Tomorrow's Nephrology: Insight-Driven Kidney Care

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Association Between Acute Kidney Injury And Early Mortality Following Cardiac Interventions: A Single-Center Cohort Study of 9,803 Patients

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Objectives : Acute kidney injury (AKI), a common complication after cardiac interventions, affects many patients and contributes to morbidity and mortality. Its pathophysiology includes ischemia-reperfusion injury, inflammation, oxidative stress, and nephrotoxic exposure. This cohort study investigated the association between AKI and short term mortality among patients undergoing cardiac interventions.

Methods : This retrospective cohort study used the Medical Information Mart for Intensive Care IV (MIMIC-IV, version 3.1) database. Adult patients who underwent cardiac interventions between 2008-2022 at Beth Israel Deaconess Medical Center were identified using International Classification of Diseases, Tenth Revision, Procedure Coding System codes. Those without pre or post procedure serum creatinine measurements or missing key baseline covariates were excluded. AKI was defined by Kidney Disease: Improving Global Outcomes (KDIGO) creatinine criteria (absolute increase ≥ 0.3 mg/dL within 48 hours or ≥ 1.5 times baseline within 7 days). The outcomes assessed were in-hospital, 30-day, and 90-day mortality and intensive care unit (ICU) length of stay. Multivariable logistic regression adjusted for demographic variables and comorbidities.

Results : Among 9,803 patients, 3,302 (33.7%) developed AKI. Mortality was significantly higher in those with AKI compared with those without: 9.7% vs 1.5% in-hospital, 9.5% vs 2.3% at 30 days, and 17.1% vs 5.2% at 90 days (all $P < 0.001$). ICU stay was longer in the AKI group (median 4.0 vs 2.0 days; $P < 0.001$). At 90 days, adjusted odds of mortality were higher with AKI (odds ratio (OR) 2.78, 95% confidence interval (CI) 2.23–3.46) and with the percutaneous route (OR 7.08, 95% CI 5.53–9.06; both $P < 0.001$). Within the AKI subgroup, mortality increased with higher KDIGO grade, showing a clear severity-dependent gradient.

Conclusions : AKI occurred in one-third of patients. It also dependently associated with increased short-term mortality as well as prolonged ICU stay, and risk escalating by severity. Therefore, early risk stratification and preventive strategies are highly recommended to improve patient outcomes after cardiac interventions.

table 1.jpg



Variable	Model	Outcome	OR (95% CI)	P-value
AKI	A	In-hospital mortality	4.19 (3.12–5.61)	<0.001
Percutaneous (vs Open)	A	In-hospital mortality	7.57 (5.52–10.39)	<0.001
AKI	A	30-day mortality	3.37 (2.54–4.48)	<0.001
Percutaneous (vs Open)	A	30-day mortality	9.48 (6.78–13.26)	<0.001
AKI	A	90-day mortality	2.78 (2.23–3.46)	<0.001
Percutaneous (vs Open)	A	90-day mortality	7.08 (5.53–9.06)	<0.001
AKI	B	In-hospital mortality	5.36 (4.03–7.12)	<0.001
Percutaneous (vs Open)	B	In-hospital mortality	10.26 (7.57–13.91)	<0.001
AKI	B	30-day mortality	4.10 (3.12–5.39)	<0.001
Percutaneous (vs Open)	B	30-day mortality	12.21 (8.87–16.81)	<0.001
AKI	B	90-day mortality	3.60 (2.91–4.45)	<0.001
Percutaneous (vs Open)	B	90-day mortality	9.68 (7.63–12.29)	<0.001

Model A (clinical) adjusted for: AKI, procedure type, age, sex, SBP, DBP, height, weight, plus comorbidities. Model B (parsimonious) adjusted for: AKI, procedure type, age, sex, SBP, DBP, height, and weight.

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Outcome	KDIGO grade	Survivors	Non survivors	P value
Hospital mortality	1	1574 (93.52%)	109 (6.48%)	<0.001
Hospital mortality	2	348 (84.67%)	63 (15.33%)	<0.001
Hospital mortality	3	1061 (87.83%)	147 (12.17%)	<0.001
30-day mortality	1	1564 (92.93%)	119 (7.07%)	<0.001
30-day mortality	2	359 (87.35%)	52 (12.65%)	<0.001
30-day mortality	3	1064 (88.08%)	144 (11.92%)	<0.001
90-day mortality	1	1471 (87.40%)	212 (12.60%)	<0.001
90-day mortality	2	323 (78.59%)	88 (21.41%)	<0.001
90-day mortality	3	945 (78.23%)	263 (21.77%)	<0.001

Values are presented as the number of patients (%). P-values from Chi-square (or Fisher's exact when expected counts < 5) compare mortality across KDIGO grades (1, 2, 3). Cohort restricted to AKI patients with valid KDIGO stage (N = 3302; AKI total in dataset = 3302). AKI, acute kidney injury; KDIGO, Kidney Disease: Improving Global Outcomes.