Acute Kidney Injury as a Risk Stratification Tool in Multiple Myeloma: Insights From a Nationwide Analysis of Mortality and 30-Day Readmission

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INTRODUCTION

- AKI complicates nearly 40% of Multiple Myeloma hospitalizations, yet its impact on short-term inpatient mortality and readmission risk remains poorly characterized at a national level.
- Hematologists lack nationally representative data to guide risk stratification at the bedside.
- Characterizing the independent prognostic impact of AKI severity on inpatient mortality and 30-day readmission would inform hematologists which patients warrant closer post discharge surveillance and how to counsel patients and families on short-term prognosis at the time of admission.

METHOD

- We conducted a retrospective cohort study using the Nationwide Readmissions Database for the year 2022. Adult patients with Multiple Myeloma (ICD-10-CM C90.0) without preexisting ESRD were included.
- Patients were classified as no AKI, AKI without dialysis, or AKI requiring dialysis.
- The primary outcome was 30-day all-cause readmission among survivors
- The secondary outcome was index in-hospital mortality.
- Multivariable survey-weighted Cox proportional hazards regression and logistic regression assessed independent associations with readmission and mortality.

CONCLUSIONS

- AKI at admission is a risk stratification tool for haematologists managing Multiple Myeloma.
- AKI independently nearly doubles in-hospital mortality and significantly increases 30-day readmission risk.
- Preexisting CKD stages 3–5 should prompt haematologists to anticipate dialysis and engage nephrology early.
- Beyond AKI, comorbidity burden, anaemia requiring transfusion, and heart failure are tools to stratify readmission risk and guide timely post discharge haematology follow-up.

RESULTS

30-Day Readmission-Free Probability by AKI and Dialysis in Multiple Myeloma

Cumulative probability of remaining readmission-free within 30 days after discharge

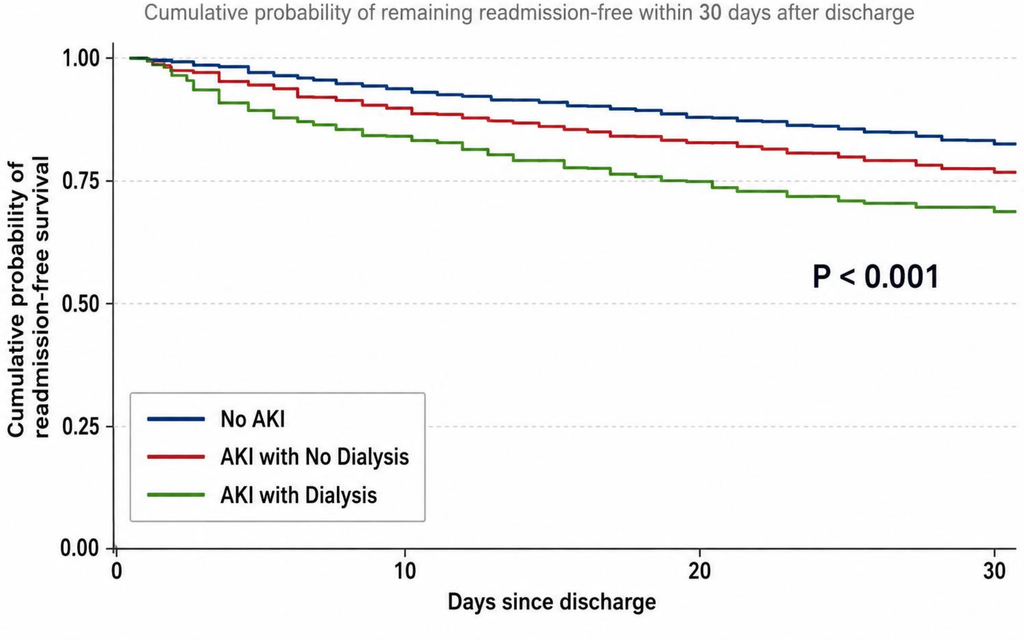

Table 1. Baseline Characteristics of Index Hospitalizations for Multiple Myeloma by AKI Category

Characteristic	No AKI (n=44,076)	AKI without Dialysis (n=27,408)	AKI with Dialysis (n=1,586)	P value
Female, %	53.0	58.3	59.6	<0.001
Age, years, mean (SE)	70.8 (0.28)	72.4 (0.18)	68.0 (0.41)	<0.001
Primary payer, %				<0.001
Medicare	73.7	77.2	65.6	
Medicaid	6.1	6.4	6.8	
Private insurance	19.4	15.5	25.1	
Charlson comorbidity category, %				<0.001
0–2	27.0	14.0	12.1	
3–4	38.4	30.7	32.1	
≥5	34.5	55.2	55.8	
CKD stage 1–2, %	1.7	2.5	1.8	<0.001
CKD stage 3–5, %	4.3	13.4	18.7	<0.001
Heart failure, %	23.6	33.3	34.4	<0.001
Anemia, %	38.0	53.4	65.8	<0.001
Anemia requiring transfusion, %	6.8	12.5	23.3	<0.001
COPD, %	0.5	0.3	0.2	0.004
Cirrhosis, %	1.2	1.9	3.4	<0.001

AKI, acute kidney injury; CKD, chronic kidney disease; COPD, chronic obstructive pulmonary disease; SE, standard error.

Table 2. Index Hospitalization Outcomes by AKI Category

Outcome	No AKI (n=44,076)	AKI without Dialysis (n=27,408)	AKI with Dialysis (n=1,586)	P value
In-hospital mortality, %	2.7	9.1	25.4	<0.001
aOR for mortality (95% CI)	Reference	1.86 (1.65–2.10)	2.68 (1.88–3.82)	<0.001
Sepsis, %	13.1	23.0	33.9	<0.001
Septic shock, %	1.8	8.0	21.9	<0.001
Acute myocardial infarction, %	3.6	6.5	8.1	<0.001
Mechanical ventilation, %	1.8	5.8	26.2	<0.001
ICU admission, %	0.7	3.8	20.7	<0.001
Discharge disposition among survivors, %				<0.001
Home/routine	57.7	46.6	42.5	
Skilled/intermediate care	16.3	22.4	25.5	
Home health care	26.0	31.0	31.9	

aOR, adjusted odds ratio; CI, confidence interval; ICU, intensive care unit.

Table 3. 30-Day Readmission Outcomes and Independent Predictors

Outcome	No AKI (n=44,076)	AKI without Dialysis (n=27,408)	AKI with Dialysis (n=1,586)	P value
Readmission rate, %	18.2	22.7	27.7	<0.001
aHR for readmission (95% CI)	Reference	1.22 (1.16–1.29)	1.46 (1.24–1.73)	<0.001

Independent Predictors of 30-Day Readmission

Predictor	aHR	95% CI	P value
AKI without dialysis	1.22	1.16–1.29	<0.001
AKI with dialysis	1.46	1.24–1.73	<0.001
Anemia requiring transfusion	1.25	1.16–1.36	<0.001
Heart failure	1.16	1.10–1.24	<0.001
Charlson comorbidity index ≥5	1.18	1.09–1.29	<0.001
Discharge to skilled/ intermediate care	1.11	1.04–1.19	0.002
Discharge to home health care	1.15	1.08–1.22	<0.001

aHR, adjusted hazard ratio; CI, confidence interval.

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