

Acute Organ Dysfunction Burden as a Predictor of In-Hospital Mortality in Leukemia Hospitalizations: A National Inpatient Sample Analysis (2018-2023)

Ramsha Khan, DO, Sameer Bhimani, MD, Omaira Chaudhary, MD, Faysal Sadeq, MD, James Cortese, MD, & Pamela Landon, MD
The Wright Center for Graduate Medical Education, Scranton, PA

Introduction

- Patients hospitalized with leukemia may develop acute organ dysfunction from infection, treatment toxicity, and systemic complications.
- The national impact of accumulating organ dysfunction on inpatient mortality is not well characterized.
- We evaluated whether increasing acute organ dysfunction burden independently predicts in-hospital mortality.

Methods

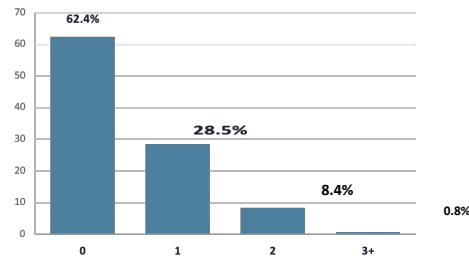
- Design: Retrospective cohort study using the National Inpatient Sample Analysis (2018-2023)
- Population: Adult hospitalizations (age > 18 years old) with AML (C92.0), CML (C92.1) or CLL (C91.10-C91.12) were identified using ICD-10 codes.
- Acute Organ Dysfunction Examples: Sepsis, Acute Kidney Injury, Liver Failure, and Acute Stroke
- Burden Score: Sum of acute organ dysfunctions present (range 0-4)
- Primary Outcome: In-Hospital Mortality
- Survey-weighted multivariate logistic regression adjusted for demographics, leukemia subtype, hospital characteristics, and baseline comorbidities.

Results

- 202,747 leukemia hospitalizations represented approximately 1,013,395 weighted hospitalizations nationwide.
- 62.4% had no acute organ dysfunction, 28.5% had one; 8.4% had two; and 0.8% had three or more.
- Each additional organ dysfunction was associated with nearly fourfold higher odds of inpatient death

Results Continued

Acute Organ Dysfunction Burden



Number of Acute Organ Dysfunctions

Most admissions had no dysfunction, but nearly 1 in 10 had two or more.

Adjusted Mortality Associations

Predictor	Adjusted OR	p-value
Each additional dysfunction	3.89 (3.80-3.99)	<0.001
AML vs CLL	1.96	<0.001
CML vs CLL	Not significant	—
Age, per year	1.02	<0.001
Atrial fibrillation	1.23	<0.001
Heart failure	1.21	<0.001

Key Finding:

3.89x higher odds of inpatient death for each additional acute organ dysfunction

Discussion

- A clear dose-response relationship was observed: mortality risk rose sharply as acute organ dysfunctions accumulated.
- AML admissions had higher adjusted mortality than CLL, whereas CML mortality did not significantly differ from CLL
- Older age, atrial fibrillation, and heart failure independently identified additional inpatient risk.
- The burden score may offer a simple framework for early risk recognition and escalation of care.
- Strengths include a large, nationally representative sample and survey-weighted adjustment.
- Limitations include reliance on administrative coding, inability to establish temporal sequence or causality, and lack of granular laboratory, treatment, and disease-severity data.

Clinical Implications & Conclusion

- Acute organ dysfunction burden is a major determinant of inpatient mortality in leukemia hospitalizations. Each additional dysfunction was associated with nearly fourfold higher odds of death, supporting early recognition and aggressive management of evolving organ injury.
- Screen early for evolving sepsis, AKI, liver failure, and acute stroke
- Escalate monitoring as organ dysfunctions accumulate.
- Integrate leukemia subtype and cardiovascular comorbidity into bedside risk assessment.
- Use standardized multidisciplinary pathways to address reversible organ injury promptly.

References

This project is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) as part of awards totaling \$19,218,208 with 43% percent financed with non-THCGME sources. The contents are those of the author(s) and do not necessarily represent the official views of, nor an endorsement, by HRSA, HHS, or the U.S. Government. For more information, please visit HRSA.gov.