Neutropenic Enterocolitis in Acute Myeloid Leukemia: A Nationwide Analysis

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Introduction

- **Neutropenic enterocolitis (NE)** is a serious gastrointestinal complication during cytopenic phases of **acute myeloid leukemia (AML)** therapy, but its effect on hospital outcomes is incompletely defined.
- We analyzed national data to quantify how NE relates to **in hospital mortality**, **length of stay (LOS)**, and **total charges** in adult AML admissions.

Aim

- To **estimate national prevalence** of **neutropenic enterocolitis** and **quantify the adjusted association** with **hospital mortality, length of stay, and hospital charges** among adult **acute myeloid leukemia** admissions.

Objectives

- To estimate the **national prevalence** of **GI bleeding** among **HM** hospitalizations.
- To compare **patient characteristics and comorbidities** by **GI bleed** status.
- To measure the adjusted associations of **GI bleeding** with **mortality** (reported as **adjusted odds ratio [aOR]**), **LOS**, and **charges** (reported as **adjusted incidence rate ratio [aIRR]**).

Methods

- We conducted a **retrospective, cross-sectional** study using the **Nationwide Inpatient Sample (NIS)** within the **Healthcare Cost and Utilization Project (HCUP)**, **2018–2022**, including adults (≥18 years) with **AML** by **International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM)** codes.
- The exposure was **NE**, identified via administrative coding with **concurrent neutropenia** documented; comparison admissions lacked codes for **neutropenia** or **enterocolitis**.
- Outcomes were **in-hospital mortality**, **LOS (days)**, and **total hospital charges (U.S. dollars)**; survey weights/clusters/strata yielded national estimates.
- We used survey-weighted **logistic regression** for mortality (**aOR**) and **Poisson regression with log link** for **LOS** and **charges** (**aIRR**), adjusting for demographics and comorbidities (e.g., **congestive heart failure [CHF]**, **renal failure**, **hypertension**, **diabetes**, **obesity**); **p < 0.05** was significant.

Results

Characteristic	NE (N = 3,865)	AML (N = 334,715)	*p*-value
Age, y (mean ± SE)	57.3 ± 0.6	62.1 ± 0.1	<0.001
Median [IQR}	47[45-68]	62[50-72]	
Female, %	49.4	45.5	<0.001
Race/Ethnicity %			<0.001
White	66.9	72.1	
Black	9.6	10.3	
Hispanic	13.3	9.6	
Other	10.2	8.0	
Primary payer, %			<0.001
Medicare	35.0	50.9	
Medicaid	16.6	11.6	
Private	42.5	32.2	
Self-pay/Other	5.9	5.3	
Comorbidities, %			
Congestive heart failure	11.8	17.1	<0.001
Hypertension	45.3	54.6	<0.001
Diabetes	17.1	22.8	0.0002
Renal failure	8.8	15.5	<0.001
Chronic liver disease	7.1	6.2	<0.001
Obesity	10.7	12.4	0.037
Elective admission, %	16.6	21.6	< 0.001
Length of stay, d (mean ± SE)	20.7 ± 0.6	11.6 ± 0.1	< 0.001
median [IQR]	18 [7–31]	6 [3–14]	—
Total charges, $ × 10^3 (mean ± SE)	280 ± 12	167 ± 4	< 0.001
median [IQR]	200 [125–337]	70 [33–176]	—
In-hospital mortality, %	7.0	8.7	0.058

Outcome (model)	Effect measure	Adjusted effect of GI bleed	95 % CI	*p*-value
In-hospital mortality	aOR	0.89 (0.75 – 1.06)	0.20	In-hospital mortality
Length of stay	aIRR	1.47 (1.41 – 1.54)	< 0.001	Length of stay
Total hospital charges	aIRR	1.44 (1.35 – 1.53)	< 0.001	Total hospital charges

- The cohort included **344,545** weighted **AML** admissions; **3,865 (1.1%)** had **NE**. **NE** patients were **younger** yet showed greater utilization.
- Unadjusted comparisons showed **longer LOS** (**20.7 vs 11.6 days**) and **higher charges** (**$280k vs $167k**), both **p < 0.001**; crude mortality was **7.0% vs 8.7%** (p = 0.058).
- After adjustment, **NE** was **not associated with higher mortality** (**aOR 0.89; 95% CI 0.75–1.06; p = 0.20**) but remained associated with **longer LOS** (**aIRR 1.47; 95% CI 1.41–1.54**) and **higher charges** (**aIRR 1.44; 95% CI 1.35–1.53**); both **p < 0.001**.

Discussion

- **NE** signals **high resource use** without a clear **mortality penalty** after adjustment, indicating room to **streamline inpatient care**.
- **Clinical practice:** Implement **neutropenic fever/NE pathways**, coordinate early **multidisciplinary care** (hematology gastroenterology), and optimize **antimicrobial, nutrition, and transfusion** support.
- **Limitations:** Reliance on **ICD-10-CM** coding, limited treatment granularity, and cross sectional design constrain causal inference.
- **Next steps:** Validate in **registry-level cohorts** capturing **severity/etiology**, and test **care bundles** aimed at reducing **LOS** and **costs** in **NE**

References

1. National (Nationwide) Inpatient Sample (NIS) Database Documentation - HCUP/AHRQ, methods and design details (accessed 2025)
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4. **Neutropenic enterocolitis in adults: systematic analysis of evidence quality** — **European Journal of Haematology**