Impact of Gastrointestinal Bleeding on Hospital Outcomes in Hematologic Malignancies: A Nationwide Analysis

P. JAIN [1], I. QAZI [1], N. GANATRA [1], H. IJAZ [2], P. SAIF [2], J. ANWAR [3]
1. Baptist Hospital of Southeast Texas, Beaumont, TX, USA.
2. King Edward Medical University, Lahore, Pakistan
3. University of Texas Health Science Center at Houston, Houston, Texas, USA

Introduction

- **Gastrointestinal (GI) bleeding** is a frequent, clinically significant complication in **hematologic malignancies (HM)**.
- Risk is heightened by **thrombocytopenia**, **coagulopathy/anticoagulation**, **chemotherapy-induced mucositis**, **steroids/NSAIDs**, and transplant factors (**HSCT/GVHD**).
- GI bleeding drives **transfusions**, **hemodynamic instability**, and **treatment delays**, potentially worsening **hospital outcomes**.
- Contemporary **national estimates** of its impact on **in-hospital mortality**, **length of stay (LOS)**, and **total charges** remain limited.
- We therefore evaluated **prevalence** and **hospital outcomes** associated with **concomitant GI bleeding** among adults hospitalized with **HM** in a national dataset.

Aim

- To quantify the association of **concomitant GI bleeding** with **in hospital mortality**, **LOS** and **total charges** among adults hospitalized **HM**

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 performed a **retrospective, cross-sectional** analysis of the **National Inpatient Sample (NIS)** within the **Healthcare Cost and Utilization Project (HCUP)** for **2018–2022**, including adults (≥18 years) with **International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM)** codes for **hematologic malignancies (HM)**.
- The exposure was **concomitant GI bleeding**, identified using **ICD-10-CM** bleeding codes (e.g., **K92.0–K92.2**, **K25.x1/x2/x4/x6**, **I85.01/11/31**).
- Outcomes were **in-hospital mortality**, **length of stay (LOS, days)**, and **total hospital charges (U.S. dollars)**; **NIS** survey weights/clusters/strata generated national estimates.
- Bivariate comparisons used **Rao–Scott χ^2** and **adjusted Wald** tests.
- Multivariable models included survey-weighted **logistic regression** for mortality (**aOR**) and **Poisson regression** for **LOS** and **charges** (**aIRR**), adjusting for demographics and comorbidities (e.g., **congestive heart failure [CHF]**, **chronic liver disease**, **renal failure**, **hypertension**, **diabetes**, **obesity**).

Results

Characteristic	GI Bleed (N = 381 795)	No GI Bleed (N = 2 477 864)	*p*-value
Age, y (mean ± SE)	68.3 ± 0.12	66.5 ± 0.10	<0.001
Female, %	44.0	42.7	<0.001
Race , %			<0.001
White	71.4	72.0	
Black	12.2	12.2	
Hispanic	10.3	9.5	
Asian / Pacific Islander	2.9	3.0	
Native American / Other	0.4	0.4	
Unknown / Multiple	2.8	3.0	
Primary payer, %			<0.001
Medicare	65.6	60.9	
Medicaid	8.3	9.2	
Private	21.9	25.2	
Self-pay	1.6	1.9	
No charge	0.2	0.2	
Other	2.4	2.6	
Comorbidities, %			
Congestive heart failure	24.0	23.0	<0.001
Hypertension	65.0	62.4	<0.001
Diabetes	27.6	26.9	0.0002
Renal failure	27.7	24.6	<0.001
Chronic liver disease	12.3	5.6	<0.001
Obesity	12.4	12.7	0.037
Outcomes (unadjusted)			
In-hospital mortality, %	12.1	10.3	<0.001
LOS, d (mean ± SE)**	10.0 ± 0.09	7.3 ± 0.04	<0.001
Total charges, $ (mean ± SE)**	144 443 ± 2 558	103 710 ± 1 554	<0.001

Outcome (model)	Effect measure	Adjusted effect of GI bleed	95 % CI	*p*-value
In-hospital mortality (logistic)	aOR	**1.22**	1.18 – 1.26	<0.001
Length of stay, days (Poisson)	aIRR	**1.36**	1.34 – 1.38	<0.001
Total charges, USD (Poisson)	aIRR	**1.40**	1.37 – 1.43	<0.001

- Of **2,859,659** weighted **HM** hospitalizations, **381,795 (13.4%)** had **GI bleeding**.
- Patients with **GI bleeding** were **older** (68.3 vs 66.5 years), had **longer length of stay (LOS)** (10.0 vs 7.3 days), and **higher total charges** (≈$144,000 vs ≈$103,000); all **p < 0.001**.
- Comorbidities were more frequent with **GI bleeding** (e.g., **chronic liver disease** 12.3% vs 5.6%; **renal failure** 27.7% vs 24.6%; **hypertension** 65.0% vs 62.4%).
- After adjustment, **GI bleeding** was associated with **higher mortality** (**aOR 1.22; 95% CI 1.18–1.26**), **longer LOS** (**aIRR 1.36; 95% CI 1.34–1.38**), and **higher charges** (**aIRR 1.40; 95% CI 1.37–1.43**); all **p < 0.001**.

Discussion

- **Interpretation: GI bleeding** signifies **higher acuity** and remains an **independent predictor** of worse hospital outcomes after adjustment.
- **Clinical implications:** Standardized **bleeding pathways**, early **gastroenterology/hematology co-management**, and proactive **transfusion/anticoagulation stewardship** may reduce risk.
- **System implications:** Prolonged **length of stay (LOS)** and higher costs highlight opportunities for **protocolized care** and **resource allocation** in high-risk units.
- **Limitations:** Use of **ICD-10-CM** codes, lack of bleeding severity/etiology, limited treatment granularity, and cross-sectional design limiting causal inference.
- **Next steps:** Validate in **clinical registries**, incorporate **bleeding severity scales** and **antithrombotic data**, and test **care bundles** in pragmatic trials.

References

1. National (Nationwide) Inpatient Sample (NIS) Database Documentation - HCUP/AHRQ, methods and design details (accessed 2025)
2. HCUP Methods Series - technical notes and best practices for HCUP/NIS analyses.
3. Endoscopic intervention in hematologic malignancy and gastrointestinal bleeding - World Journal of Gastrointestinal Endoscopy