

# Ischemic Stroke Patients Bleed More: A Nationwide Inpatient Database Analysis

Umar Hayat, MD; Ayla Karca, MD; MD; Karna Desai, MD; Shefali Amin, MD; Wasique Mirza, MD, FACP

Geisinger Wyoming Valley Medical Center

## Introduction

- Ischemic stroke is the most common type of stroke.
- Recent studies have shown that patients with ischemic stroke are at an increased risk of Upper gastrointestinal bleeding (UGIB).
- Our study aims to explore the relationship between UGIB and stroke and prognostic factors leading to worse outcomes if stroke patients have UGIB.

## Methods and materials

- National Inpatient Sample (NIS) from 2016-2020 was queried using ICD-10-CM Codes to identify a cohort of inpatient admissions with a primary discharge diagnosis of ischemic stroke and a secondary diagnosis of UGIB.
- A weighted sample was used to get baseline characteristics, length of hospital stays (LOS), and resource utilization during the inpatient admissions.
- Multivariate logistic regression analysis followed by predictive margins was used to obtain adjusted estimates of the length of hospital stay, mechanical ventilation, shock development, resource utilization, and mortality.

## Results

- Among 503345 patients hospitalized with ischemic stroke, 1215 (0.24%) patients had a concurrent diagnosis of UGIB; compared to males, females with ischemic stroke were less likely to have UGIB (58.7% vs. 41.3%).
- The mean age was similar in both groups (69.7 years vs. 72.5 years).
- Patients with ischemic stroke with UGIB were more likely to have a shock (9.1% vs. 0.13%) and have mechanical ventilation (3.3% vs. 1.2%), resulting in a more extended LOS than those without UGIB (10.85d vs. 4.52d)—table 1.
- On multivariate analysis, patients with ischemic stroke were more likely to have extended hospitalization aOR: 5.22 days (95% CI: 4.09-6.35), higher hospital charges (74368.87 (95% CI: 56666.05 - 92071.68), and a higher mortality aOR: 2.12 (95% CI: 1.36- 3.31) than those without UGIB.

## Conclusions

- This study demonstrated that patients with ischemic stroke who had UGIB were more likely to be admitted to the ICU and had an increased LOS and a higher mortality. Furthermore, these patients had higher total hospitalization charges than those without UGIB.

Table 1. Demographic characteristics.

Variables	Cerebral ischemia without UGIB N=503345	Cerebral ischemia with UGIB N=1215	p-value
Age n (SD)	69.7 (13.8)	72.5 (11.7)	< 0.01
Female n (%)	246960 (49.1)	490 (40.3)	< 0.01
Race n (%)			0.2911
White	330205 (67.4)	790 (66.1)	
Charlson Comorbidity Index (SD)	3.85 (2.12)	5.3 (2.39)	< 0.01
Hospital Type n (%)			
Urban n (%)	468765 (93.1)	1155 (95.1)	0.23
Teaching n (%)	383480 (76.2)	945 (77.8)	0.51
Payer Information n (%)			< 0.05
Medicare n (%)	317515 (65.1)	900 (75.6)	
Private Insurance n (%)	97765 (20.03)	160 (13.5)	
Shock n (%)	654 (0.13)	110 (9.1)	< 0.01
Mechanical Ventilation n (%)	5855 (1.2)	40 (3.3)	< 0.01
LOS (days)	4.52 (95% CI 4.47-4.58)	10.87 (95% 9.72- 12.01)	< 0.01
Disposition n (%)			< 0.01
Home	179415 (35.65)	200 (16.46)	
SNF	190310 (37.82)	550 (45.27)	
AMA	6655 (1.32)	10 (0.823)	
Died	19660 (3.91)	285 (2.35)	

### Multivariate Analysis

Multivariate Analysis		
Resource Utilization and Mortality		
Unadjusted and adjusted* Odds for Mortality		
Unadjusted	2.69 (95%CI: 1.76- 4.12)	0.001
Adjusted	2.12 (95%CI: 1.36-3.31)	0.001
Unadjusted and adjusted *Odds ratios for increased LOS		
Unadjusted	6.37(95%CI: 5.23 - 7.52)	<0.01
Adjusted	5.22 (95%CI: 4.09- 6.35)	<0.01
Unadjusted and Adjusted* Odds for increased total charges		
Unadjusted	79900.36 (95% CI: 61768.14 - 98032.58)	<0.01
Adjusted	74368.87 (95% CI: 56666.05 - 92071.68)	<0.01

UGIB= Upper gastrointestinal bleed CI cerebral infarction. LOS Length of stay. \*Adjusted for Age, Gender, Race, Charlson Comorbidity Index, Hospital (Teaching Status, Bed Size)

Multivariate analysis showing comparison of resource utilization, LOS, and mortality among stroke patients with and without UGIB Abbreviations: UGIB: Upper gastrointestinal bleed CI: cerebral infarction. LOS: Length of stay. \*Adjusted for Age, Gender, Race, Charlson Comorbidity Index, Hospital (Teaching Status, Bed Size)