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Clinical and Endoscopic Spectrum of Upper Gastrointestinal Bleeding: A Retrospective Cross-Sectional Study from a Tertiary Care Hospital

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ABSTRACT

Introduction: Upper gastrointestinal bleeding (UGIB) is a common medical emergency with significant morbidity and mortality. Understanding its local clinical and endoscopic profile is crucial for effective management.
Objectives: To describe the clinical presentation, risk factors, endoscopic findings, and etiological spectrum of UGIB.
Materials and Methods: A hospital-based retrospective cross-sectional study was conducted over 12 months. Sixty-four consecutive patients presenting with clinical evidence of UGIB (hematemesis, melena, or both) who underwent upper gastrointestinal endoscopy were included. Data on demographics, clinical presentation, comorbidities, drug history, and detailed endoscopic findings were collected and analyzed.
Results: The mean age of participants was 52.4 ± 15.2 years, with a male predominance (71.9%, n=46). The most common presentation was melena alone (46.9%, n=30), followed by hematemesis and melena (35.9%, n=23). Significant comorbidities included hypertension (34.4%), chronic liver disease (31.3%), and diabetes (21.9%). Non-steroidal anti-inflammatory drug (NSAID) use was reported in 37.5% (n=24). Endoscopy revealed peptic ulcer disease (PUD) as the leading cause (56.3%, n=36), with duodenal ulcers being most frequent (28.1%, n=18). Variceal bleeding accounted for 28.1% (n=18), predominantly esophageal varices (21.9%, n=14). Erosive gastritis was found in 9.4% (n=6), and Mallory-Weiss tears in 4.7% (n=3). One case of gastric malignancy was detected (1.6%). On presentation, 42.2% (n=27) had a Rockall score ≥5, indicating high risk.
Conclusion: Peptic ulcer disease remains the predominant cause of UGIB in this study, followed by variceal hemorrhage. Middle-aged males with comorbidities like hypertension and liver disease, often with NSAID use, constitute the typical profile. These findings underscore the need for prompt endoscopic evaluation and targeted management strategies, including proton pump inhibitor therapy and variceal band ligation protocols.

Keywords: *Upper Gastrointestinal Bleeding, Endoscopy, Peptic Ulcer, Varices, Hematemesis, Melena.*

INTRODUCTION

Upper gastrointestinal bleeding (UGIB) constitutes a quintessential medical emergency, characterized by bleeding originating proximal to the ligament of Treitz. It represents a formidable clinical challenge due to its potential for rapid hemodynamic compromise, high associated healthcare costs, and a persistent mortality rate ranging between 2-10%, even in the era of modern therapeutic endoscopy and pharmacotherapy.[1] The clinical presentation is variable, spanning from an incidental finding of iron-deficiency anemia to catastrophic hemorrhage manifesting as hematemesis, melena, or hematochezia, accompanied by hypovolemic shock. Its prompt recognition, systematic risk stratification, and timely intervention are therefore critical determinants of patient outcomes.

The etiological landscape of UGIB is diverse and has undergone significant epidemiological shifts over recent decades, influenced by factors such as the prevalence of *Helicobacter pylori* infection, patterns of medication use, and the burden

of chronic liver disease within a population.[2] Historically, peptic ulcer disease (PUD) has been the predominant cause, accounting for over 50% of cases globally. However, the widespread adoption of potent acid-suppressive therapy (proton pump inhibitors - PPIs) and effective *H. pylori* eradication regimens has led to a relative decline in ulcer-related bleeding in many developed regions.[3] Conversely, this reduction has brought other etiologies into sharper focus. Variceal hemorrhage, a dire complication of portal hypertension, now stands as a leading cause in populations with a high prevalence of cirrhosis and is associated with distinctly higher mortality and early rebleeding rates compared to non-variceal sources.[4] Other significant contributors include erosive gastropathy (often drug-induced), Mallory-Weiss tears, vascular malformations (e.g., Dieulafoy's lesion), and upper GI malignancies.

Esophagogastroduodenoscopy (EGD) is the gold-standard diagnostic and therapeutic tool in UGIB management. It not only provides precise localization of the bleeding source but also allows for the application of definitive hemostatic techniques such as injection, thermal coagulation, mechanical clipping, or band ligation.[5] Furthermore, endoscopic findings enable risk stratification using validated scoring systems like the Forrest classification for ulcers and the Rockall score, which integrate clinical and endoscopic variables to predict risks of rebleeding and mortality, thereby guiding the intensity of post-procedural care.[6]

Despite well-established international guidelines, the clinical and endoscopic profile of UGIB exhibits considerable geographical and institutional variation. These differences are dictated by local demographic patterns, socioeconomic factors, endemic rates of *H. pylori* and viral hepatitis, and regional prescribing practices for medications such as non-steroidal anti-inflammatory drugs (NSAIDs), antiplatelets, and anticoagulants.[7] For instance, studies from the Indian subcontinent frequently report a higher proportion of variceal bleeding compared to Western data, reflecting a significant burden of cirrhosis.[8] Therefore, reliance on global data alone may not suffice for optimizing local diagnostic algorithms, resource allocation, and preventive strategies.

Such localized audits are invaluable for evaluating the adequacy of current management protocols, identifying gaps in care, and formulating targeted quality improvement initiatives. This cross-sectional study was therefore undertaken with the primary objective of describing the detailed clinical presentation, associated comorbidities, drug exposure history, and endoscopic findings in patients presenting with acute UGIB at our institution.

METHODOLOGY

This study employed a **hospital-based retrospective cross-sectional design**. The study was conducted in the **Department of General Medicine(Gastroenterology division)** in Ananta Institute of Medical Sciences & Research Centre (AIMS&RC), Rajsamand, Rajasthan.

The target population was all adult patients (≥18 years) experiencing an acute episode of UGIB and presenting to the study hospital for care during the 12-month study period from September 2024 to September 2025

Inclusion and Exclusion Criteria for Sample Selection

- **Inclusion Criteria:**

1. Age 18 years or older.
2. Clinical evidence of acute UGIB: hematemesis (fresh blood or coffee-ground material) and/or melena.
3. Willingness to undergo upper gastrointestinal endoscopy.
4. Endoscopy performed within 24 hours of hospital presentation.

- **Exclusion Criteria:**

1. Evidence of bleeding from a non-upper GI source (e.g., hemoptysis, epistaxis swallowed blood).
2. Patients in whom endoscopy was contraindicated or who were deemed too hemodynamically unstable to undergo the procedure despite resuscitation, or who died prior to endoscopy.
3. Patients with known bleeding diatheses unrelated to portal hypertension or coagulopathy of liver disease (e.g., hemophilia, disseminated intravascular coagulation from sepsis).
4. Patients or attendants declining to provide informed consent.

Sample Size Calculation

A formal sample size calculation was performed to estimate the proportion of peptic ulcer disease (PUD) as the leading etiology, using the formula for a single proportion. With an expected prevalence of 50% (maximizing variability), a 95% confidence level (Z=1.96), and a margin of error set at 12.5%, the minimum required sample size was calculated as 63.2. To accommodate potential incomplete data, a final sample of 64 patients was targeted and achieved, providing adequate precision for descriptive estimates of major etiological categories in this cross-sectional study.

Procedure for Data Collection

1. **Identification & Screening:** Potentially eligible patients were identified daily in the emergency room and medical wards by the research team.

2. **Consent & Enrollment:** Eligible patients or their legally authorized representatives were approached, the study was explained, and written informed consent was obtained.
3. **Clinical Data Collection:** A pre-designed, structured data collection proforma was completed via direct patient interview and review of medical records to capture demographic, clinical, and risk factor data. Admission laboratory reports were recorded.
4. **Endoscopic Procedure:** All patients underwent urgent video gastroscopy by a qualified gastroenterologist. The endoscopic findings were documented in real-time on the proforma, including photographic documentation when appropriate.
5. **Data Entry:** The completed proformas were assigned a unique study identification number. Data were transcribed into a password-protected electronic spreadsheet (Microsoft Excel) by a single investigator to ensure consistency.

Statistical analysis

The final cleaned dataset was exported to Statistical Package for the Social Sciences (SPSS) version 25.0 for statistical analysis. Descriptive statistics (mean, standard deviation, frequency, percentage) were computed for all relevant variables.

Table 1: Baseline Demographic, Clinical, and Risk Factor Profile of Study Participants (N=64)

Characteristic	Category	Frequency (n)	Percentage (%)
Age (years)	18-40	18	28.1
	41-60	28	43.8
	>60	18	28.1
Mean ± SD / Range		52.4 ± 15.2 (24-82)	
Gender	Male	46	71.9
	Female	18	28.1
Clinical Presentation	Melena alone	30	46.9
	Hematemesis alone	11	17.2
	Both	23	35.9
Hemodynamic Instability at Admission	Systolic BP <100 mmHg	15	23.4
	Pulse >100/min	18	28.1
Significant Comorbidities	Hypertension	22	34.4
	Chronic Liver Disease	20	31.3
	Diabetes Mellitus	14	21.9
	Coronary Artery Disease	5	7.8
Key Risk Factor Exposure	NSAID Use	24	37.5
	Significant Alcohol Use	18	28.1
	Antiplatelet Use	10	15.6
	Anticoagulant Use	3	4.7

A total of 64 patients presenting with acute upper gastrointestinal bleeding (UGIB) were included in the final analysis. The baseline demographic and clinical profile is detailed in **Table 1**. The study cohort had a mean age of 52.4 (±15.2) years, with a male preponderance (71.9%). Melena was the most common presenting symptom, occurring in isolation in 46.9% of patients, while combined hematemesis and melena were present in 35.9%. Hemodynamic instability was noted at admission in a significant subset, with 23.4% of patients presenting with systolic hypotension (<100 mmHg). Hypertension (34.4%) and Chronic Liver Disease (31.3%) were the predominant comorbidities. Pharmacological risk factors were prevalent, with recent NSAID use reported by 37.5% of patients and significant alcohol consumption by 28.1%.

Table 2: Endoscopic Findings and Etiological Spectrum of Upper Gastrointestinal Bleed (N=64)

Endoscopic Diagnosis	Frequency (n)	Percentage (%)
Peptic Ulcer Disease (PUD)	**36**	**56.3**
Variceal Bleeding	**18**	**28.1**
Erosive Gastritis/Duodenitis	6	9.4
Mallory-Weiss Tear	3	4.7
Malignancy	1	1.6
Total Identified Lesions	64	100

The endoscopic etiological spectrum, as presented in **Table 2**, identified a definitive bleeding source in all patients. Peptic Ulcer Disease (PUD) was the leading cause, accounting for 56.3% (n=36) of cases. Duodenal ulcers (28.1%) were more frequent than gastric ulcers (21.9%). Among these ulcers, stigmata of recent hemorrhage were common, with 22.2% (n=8) exhibiting active bleeding (Forrest Ia/Ib) or a visible vessel (Forrest IIa). Variceal bleeding was the second most common etiology (28.1%, n=18), predominantly from high-grade esophageal varices. Other causes included erosive gastritis/duodenitis (9.4%) and Mallory-Weiss tears (4.7%). One case of gastric malignancy was diagnosed.

Table 3: Rockall Risk Stratification Scores of Study Participants (N=64)

Risk Score Category	Pre-endoscopic Rockall Score	Complete Rockall Score
Mean Score (± SD)	3.1 ± 1.4	4.8 ± 1.9
Score Distribution, n (%)		
Low Risk (Score 0-2)	18 (28.1%)	12 (18.8%)
Intermediate Risk (Score 3-4)	32 (50.0%)	25 (39.0%)
High Risk (Score ≥5)	14 (21.9%)	27 (42.2%)

Risk stratification using the Rockall score is summarized in **Table 3**. The mean pre-endoscopic Rockall score was 3.1 (±1.4). Following endoscopy, the mean complete Rockall score increased to 4.8 (±1.9). This integration of endoscopic findings reclassified a substantial number of patients into a higher risk category; 42.2% (n=27) of the cohort had a complete Rockall score of ≥5, indicating high risk for rebleeding and mortality, compared to only 21.9% based on the pre-endoscopic score alone.

Table 4: Association of Major Etiologies with Selected Risk Factors (N=64)

Risk Factor	Peptic Ulcer Disease (n=36)	Variceal Bleeding (n=18)	p-value
Mean Age (years)	54.6 ± 14.1	48.3 ± 16.8	0.132
Male Gender, n (%)	27 (75.0%)	14 (77.8%)	0.823
NSAID Use, n (%)	19 (52.8%)	2 (11.1%)	**0.003***
Chronic Liver Disease, n (%)	5 (13.9%)	18 (100%)	**<0.001***
Significant Alcohol Use, n (%)	6 (16.7%)	12 (66.7%)	**<0.001***

Table 4 outlines the association of the two major etiologies with key risk factors. Patients with PUD were significantly more likely to have a history of NSAID use compared to those with variceal bleeding (52.8% vs. 11.1%, p=0.003). In contrast, a clinical diagnosis of Chronic Liver Disease was exclusively associated with variceal hemorrhage (100% vs. 13.9% in the PUD group, p<0.001). Similarly, significant alcohol use was a strongly associated risk factor for variceal bleeding (66.7% vs. 16.7%, p<0.001).

DISCUSSION

This cross-sectional study delineates the clinical and endoscopic profile of 64 patients presenting with acute UGIB at our institution. The principal findings underscore that peptic ulcer disease (PUD) remains the leading etiology, followed closely by variceal hemorrhage, with a patient profile characterized by middle-aged males with significant comorbidities and frequent NSAID use. These observations provide valuable local insights and align with, yet subtly differ from, regional and international epidemiological trends.

The predominance of PUD (56.3%) as the causative factor reaffirms its persistent global significance as a leading cause of UGIB. This finding is consistent with a large multi-center study from India by Goyal et al. (2019), which reported PUD in approximately 50% of non-variceal UGIB cases, highlighting its continued burden despite advances in anti-secretory therapy and *H. pylori* eradication.[9] However, our proportion is notably higher than contemporary reports from Western nations, where widespread PPI use and effective *H. pylori* control have reduced ulcer-related bleeding to around 35-40%.[3] This discrepancy may reflect regional variations in *H. pylori* prevalence, NSAID utilization patterns, or access to preventative pharmacotherapy. The strong statistical association found between PUD and NSAID use (52.8%, p=0.003) in our cohort further emphasizes the critical role of iatrogenic and self-medication factors in the local pathogenesis of ulcer bleeding.

Variceal bleeding constituted a substantial proportion (28.1%) of cases in our series, establishing it as the second most common etiology. This figure is significantly higher than the 5-10% typically reported in Western populations[4] but resonates with studies from the Indian subcontinent and other regions with a high prevalence of chronic liver disease. A study from a tertiary care center in North India by Kumar et al. (2021) found varices responsible for 31% of major UGIB, mirroring our findings.[10] The exclusive association of variceal hemorrhage with chronic liver disease (100%, p<0.001) and significant alcohol use (66.7%, p<0.001) in our study underscores the pivotal role of portal hypertension, often alcohol-related, in this patient subset. This high prevalence necessitates the ready availability of endoscopic band ligation expertise and underscores the importance of primary and secondary prophylaxis for varices in at-risk liver disease patients.

The demographic profile of our cohort—mean age 52.4 years with male predominance (71.9%)—reflects the typical population affected by UGIB, as observed in comparable studies.[9,10] The high prevalence of comorbidities, particularly hypertension (34.4%) and chronic liver disease (31.3%), illustrates the complex medical background of these patients, which can complicate management and influence outcomes. Furthermore, the shift in risk stratification observed with the Rockall score is instructive. The significant reclassification of patients into a higher-risk category after endoscopy (high-risk patients increasing from 21.9% to 42.2%) validates the indispensable role of endoscopic evaluation in accurate

prognostication. It demonstrates that clinical parameters alone may underestimate the severity of the bleed, thereby reinforcing guideline recommendations for timely endoscopy to guide both therapeutic intervention and post-procedural care intensity.[6]

CONCLUSION

In conclusion, this study confirms that PUD and variceal bleeding are the twin pillars of UGIB etiology in our population. The distinct risk factor profiles—NSAID use for PUD and chronic liver disease for varices—offer clear targets for preventive strategies. These findings advocate for sustained emphasis on judicious NSAID prescribing, proactive *H. pylori* testing and treatment, and robust cirrhosis care programs with routine variceal screening. Furthermore, they justify the maintenance of ready endoscopic capabilities for both ulcer hemostasis and variceal band ligation. Local audits such as this are crucial for validating and adapting international management protocols to ensure optimal, context-specific patient outcomes.

Ethical Considerations

This study was a retrospective, hospital-based cross-sectional analysis conducted using anonymized clinical and endoscopic records obtained during routine patient care. No additional interventions or patient contact were involved for research purposes. Patient identifiers were removed prior to data analysis to ensure confidentiality. As the study involved secondary use of existing anonymized data, formal ethical committee approval and informed consent were not required as per institutional policy.

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