RESEARCH PAPER

Clinical And Endoscopic Profile Of Upper Gastrointestinal Bleed In Tertiary Care Hospital In Northern India

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ABSTRACT

Background: Upper gastrointestinal bleeding (UGIB) remains a significant medical emergency with considerable morbidity and mortality. The etiological spectrum and outcomes vary geographically, with developing regions showing a higher burden of variceal bleeding due to chronic liver disease. This study aimed to evaluate the clinical profile, endoscopic findings, risk factors, and outcomes of UGIB in a tertiary care center in Northern India.

Methods: This cross-sectional observational study included 145 adult patients presenting with hematemesis and/or melena between April 2024 and November 2025. Clinical details, risk factors, laboratory parameters, Rockall scores, endoscopic findings, and outcomes were recorded. Patients were also categorized based on timing of endoscopy (early ≤1 day vs delayed >1 day). Statistical analysis was performed using appropriate parametric and non-parametric tests, with $p < 0.05$ considered significant.

Results: The mean age was 51.55 ± 15.01 years, with male predominance (69%). Melena (72.4%) was more common than hematemesis (51.7%). Alcohol consumption (61.38%) and smoking (59.31%) were the most frequent risk factors. Variceal bleeding was the predominant etiology (71.72%), followed by peptic ulcer disease (22.75%). Patients with variceal bleeding had significantly lower hemoglobin, platelet counts, and serum albumin, along with higher PT/INR ($p < 0.05$). Mortality was low (~2%) but significantly associated with hemodynamic instability and low hemoglobin. Higher Rockall scores were significantly associated with rebleeding ($p = 0.0005$) and mortality ($p = 0.017$). Early endoscopy was associated with reduced mortality (0% vs 3.65%, $p = 0.048$) and rebleeding ($p = 0.003$).

Conclusion: UGIB in this setting predominantly affects middle-aged males and is largely driven by variceal bleeding related to chronic liver disease. Early endoscopy and risk stratification using Rockall score significantly improve outcomes. Public health strategies targeting alcohol-related liver disease and strengthening early endoscopic services are essential.

Keywords: Upper gastrointestinal bleeding; Variceal bleeding; Endoscopy; Rockall score; Liver cirrhosis; Risk factors; Rebleeding; Mortality; India

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1. INTRODUCTION

Upper Gastrointestinal (UGI) bleeding refers to blood loss originating proximal to the ligament of Treitz, involving the oesophagus, stomach, or duodenum.[1] Clinically, it commonly presents as haematemesis, coffee-ground vomiting, or melena; severe cases may manifest with haematochezia and haemodynamic instability.[2] Even moderate haemorrhage can precipitate shock, multiorgan failure, and death, making UGI bleeding a true medical emergency requiring prompt resuscitation, early oesophago-gastro-duodenoscopy (OGD), and coordinated multidisciplinary care. Endoscopy serves both diagnostic and therapeutic roles, enabling injection therapy, thermal or mechanical haemostasis, and specific interventions such as band ligation or glue therapy for variceal bleeding. Adjunctive pharmacotherapy, including proton pump inhibitors, vasopressors, and antibiotic prophylaxis (in portal hypertensive bleeds), further supports haemostasis.

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Optimal outcomes depend on early recognition and risk-stratified management pathways.[3,4]

Population-based studies estimate the annual incidence of UGI bleeding to be 80–150 cases per 100,000 persons.[4,5] Mortality ranges from approximately 2% in low-risk groups to nearly 10% among elderly patients, those with comorbidities, or individuals experiencing re-bleeding. Re-bleeding occurs in 7–33% of cases and significantly increases both healthcare costs and mortality, highlighting the importance of effective secondary prevention. Although incidence has declined modestly in high-income regions, mortality has remained relatively unchanged due to population ageing, increased use of antithrombotic agents, and rising prevalence of chronic liver disease.[4]

Peptic ulcer disease (PUD) remains the most common cause of UGI bleeding, accounting for approximately 40% of cases globally, followed by portal hypertensive varices (15–30%).[5] Other causes include erosive oesophagogastric disease, Mallory–Weiss tears, malignancies, and less common vascular or iatrogenic lesions.[6] However, the relative contribution of these causes varies significantly by geography. High-income countries have seen a decline in ulcer-related bleeding due to widespread proton pump inhibitor use and Helicobacter pylori eradication, offset by increased exposure to aspirin, NSAIDs, and anticoagulants. In contrast, low- and middle-income countries (LMICs) report a higher prevalence of variceal bleeding driven by viral hepatitis and alcohol-related cirrhosis, while transitional regions exhibit mixed patterns due to evolving epidemiological trends.5

India carries a substantial burden of UGI bleeding, though comprehensive national data are limited. Hospital-based studies indicate that 4–12% of emergency admissions are due to UGI haemorrhage. Regional variations are pronounced: a large audit from Srinagar reported peptic ulcer disease in 48% of cases and varices in approximately 6%, whereas studies from North India report varices as the leading cause in up to 46–54% of patients. Southern and coastal regions demonstrate an even higher predominance of variceal bleeding, reflecting increased cirrhosis prevalence.[2,3] Risk factors also vary, with chronic alcohol use (40–60%), NSAID consumption (10–20%), and increasing anticoagulant use contributing significantly.[7] These variations underscore the need for region-specific prevention and management strategies.

Most existing risk stratification tools, such as the Glasgow-Blatchford and Rockall scores, are derived from Western populations and may not accurately predict outcomes in Indian settings.[8,9] Differences in demographics, comorbidity profiles, and healthcare infrastructure limit their applicability. Furthermore, decisions regarding endoscopy timing, transfusion strategies, and intensive care utilization depend heavily on local disease patterns and resource availability. Therefore, a focused audit in a high-volume tertiary care centre in Northern India is essential to (i) characterize clinical presentation, endoscopic findings, and outcomes specific to the region, and (ii) generate context-relevant data to optimize triage, management protocols, and resource allocation. The aim and objectives of the study are as below:

Aim: To determine the Clinical and Endoscopic profile of UGI bleed, risk factors and outcome in these patients attending tertiary care centre in northern India.

Objectives:

1. To assess the spectrum of aetiology of UGI bleed
2. The common risk factors associated with UGI bleed

Material and Methods:

This was a cross-sectional observational study conducted in the Department of General Medicine, School of Medical Sciences & Research (SMS&R), Sharda University, Greater Noida, India from April 2024 to November 2025. The study protocol received approval from the institutional ethics committee. Participant confidentiality was maintained throughout the study. We used an enumeration approach during the study period, including all eligible patients. The minimum sample size was estimated using Slovin's formula with a 5% margin of error. A final sample size of 145 was chosen.

We enrolled consecutive adults (≥18 years) admitted with symptoms of Upper Gastrointestinal (UGI) bleeding—hematemesis and/or Melena. Exclusion criteria comprised refusal to provide consent, presentation with lower GI bleeding, any contraindication to endoscopy (including orodental abnormalities), suspected or known perforation, corrosive ingestion, known or suspected coagulopathy, and severe thrombocytopenia.

Data collection and measurements: After written informed consent had been obtained, demographic details (name, age, sex, occupation, address) were recorded. A structured proforma captured Clinical history (nature of bleeding; nausea, vomiting, dysphagia, regurgitation, heartburn, abdominal pain; appetite and weight change; bowel habit change; alcohol and smoking history) and medication history (e.g., NSAIDs/antiplatelets). Focused examination documented blood pressure, heart rate, and postural symptoms. Ancillary imaging (ultrasound or CT) was performed when clinically indicated. The case-record form further captured comorbidities, vital signs, a standard laboratory panel (haematology, Liver and renal function, coagulation profile), and imaging. Risk stratification included calculation of the Rockall score. Endoscopic findings, therapeutic interventions, histopathology (if biopsies were taken), and final outcome were recorded.

Endoscopic procedure: Following initial resuscitation and hemodynamic stabilization—with correction of blood loss and electrolyte imbalance—patients underwent Upper GI endoscopy. An Olympus 190 series endoscope was used. Topical anaesthesia was provided with 10% xylocaine spray. The scope was introduced orally, traversing the Upper oesophageal sphincter into the oesophagus, Stomach, and Duodenum, with retroflexion in the Stomach to visualize the fundus. Lesions with ulceration or irregular margins/surface were considered suspicious for malignancy and were biopsied for histology. Therapeutic Endoscopic interventions (e.g., Band ligation, Glue injection, clipping, cauterization) were performed when indicated.

Outcomes: Prespecified outcomes included the Endoscopic aetiology and stigmata of bleeding, need for Endoscopic therapy, and disposition at discharge; the case-record form also captured a "final outcome," allowing derivation of in-hospital outcomes.

Statistical analysis:
Group comparisons were done with Welch's two-sample t-tests and independent t test for continuous data. Endoscopy-timing groups (≤1 day vs >1 day) were compared for rebleeding and mortality with Chi-square/Fisher's exact tests and for transfusion units and length of stay with Welch's t-tests. Statistical significance was interpreted at the 0.05 level, and results were reported with exact p values.

Results:
The mean age of patients was 51.55 ± 15.01 years, with a male predominance (69.0%). Melena (72.4%) was more common than hematemesis (51.7%). Alcohol consumption (61.38%) and smoking (59.31%) were the most frequent risk factors. Endoscopic evaluation revealed variceal bleeding as the most common etiology (71.72%), followed by peptic ulcer disease (22.75%). Overall, variceal bleeds constituted 71.7% of cases (Table 1).

Table 1: Demographic, clinical, risk factors and etiological profile (n = 145)

Variable	Category	Value
Demographics	Age (years), mean ± SD	51.55 ± 15.01
	Age range (years)	18 – 85
	Male, n (%)	100 (69.0)
	Female, n (%)	45 (31.0)
Clinical Presentation	Hematemesis alone (%)	51.70%
	Melena alone (%)	72.40%
Risk Factors	Alcohol intake, (%)	61.38%
	Smoking	59.31%
	NSAID use	9.65%
Etiology	Variceal bleed (oesophageal/gastric varices)	71.72%
	Peptic ulcer disease	22.75%
	Malignancy	3.44%
	Gastric antral vascular ectasia	0.69%
	Mallory–Weiss tear	0.69%
	Normal study	0.69%
	Variceal	71.70%
	Non-variceal	28.30%

In comparison with the non-Variceal group, patients with Variceal bleeding had significantly lower haemoglobin (8.87 ± 1.57 vs 9.49 ± 2.25; p = 0.0301) and lower platelet counts (101.88 ± 48.15 vs 148 ± 109.8; p = 0.0140). Serum albumin was also significantly reduced in the Variceal group (2.96 ± 0.49 vs 3.50 ± 0.69 g/dL; p = 0.0001), while PT/INR was significantly higher (1.50 ± 0.30 vs 1.34 ± 0.25; p = 0.0004) – i.e., more advanced hepatic dysfunction in Variceal bleeding (table 2).

Table 2: Laboratory indices by aetiology group (Variceal vs non-variceal)

Variable	Aetiology Group	N	Min	Mean±SD	Max	p-value
Hemoglobin (g/dL)	Variceal	104	4.1	8.87±1.57	14.4	0.0301
	Non-variceal	41	4.2	9.49±2.25	15	
Platelet count	Variceal	104	20	101.88±48.15	360	0.014
	Non-variceal	41	20	148±109.80	726	
Serum Albumin (g/dL)	Variceal	104	1.6	2.96±0.49	4.6	0.0001
	Non-variceal	41	1.8	3.50±0.69	4.9	
PT/INR	Variceal	104	0.96	1.50±0.30	2.4	0.0004
	Non-variceal	41	1.03	1.34±0.25	2.1	
MCV (fL)	Variceal	104	77	92.93±8.26	116	0.2741
	Non-variceal	41	78	91.79±8.78	115	

In-hospital deaths were few (n = 3). Lower baseline haemoglobin was associated with mortality (p = 0.0466). PT/INR showed a trend to higher values among those who died (p=0.0675). An unstable Haemodynamic status was strongly associated with death (p=0.0132, Fisher's exact). Differences across ascites and hepatic encephalopathy were all observed to be statistically significant (table 3).

Table 3: Comparisons by mortality- outcome vs predictors

Variable	Outcome	n	Min	Mean ± SD	Max	p-value (Welch's t-test)
Age (years)	Death	3	53	67.33±13.20	79	0.1659
	Non-death	142	18	51.23±14.87	85	
Hemoglobin (g/dL)	Death	3	7.2	7.87±1.00	9	0.0466
	Non-death	142	4.1	9.08±1.77	15	
MCV (fL)	Death	3	78.9	87.22±6.23	94	0.0204
	Non-death	142	72	92.27±9.88	116	
Platelet count (×10⁹/L)	Death	3	20	34.67±21.50	60	0.0079
	Non-death	142	15	116.78±74.26	726	
Serum albumin (g/dL)	Death	3	1.6	2.10±0.46	2.5	0.0556
	Non-death	142	1.8	3.12±0.58	4.9	
PT/INR	Death	3	1.43	1.88±0.39	2.1	0.1880
	Non-death	142	0.96	1.44±0.28	2.4	

The mean Rockall score in the study population was 2.24 ± 1.68. Patients who developed rebleeding had significantly higher scores compared to those without rebleeding (3.46 ± 1.72 vs 2.00 ± 1.58; p = 0.0005). Similarly, patients who died had significantly higher Rockall scores than survivors (6.00 ± 1.00 vs 2.16 ± 1.61; p = 0.017), indicating its strong predictive value for adverse outcomes (Table 4).

Table 4: Rockall Score Distribution and Its Association with Rebleeding and Mortality (n = 145)

Variable	Group	n	Mean±SD	p-value (Welch's t-test)
Overall Rockall Score	All patients	145	2.24±1.68	—
Rockall Score by Rebleeding	Yes	24	3.46±1.72	0.0005
	No	121	2.00±1.58	
Rockall Score by Mortality	Death	3	6.00±1.00	0.017
	Survivors	142	2.16±1.61	

The mean time to endoscopy was 1.97 ± 1.02 days (range: 1–5 days). Early endoscopy (≤1 day) was performed in 43.44% of patients, while 56.56% underwent delayed endoscopy. Mortality was significantly higher in the delayed endoscopy group (3.65% vs 0%; p = 0.048). Rebleeding rates were also significantly associated with timing of endoscopy (p = 0.003), with differences observed between early and late groups (table 5).

Table 5: Time to Endoscopy, Timing Groups, and Their Association with Mortality and Rebleeding (n = 145)

Variable	Category	n	Value	%	p-value	Test
Time to Endoscopy (days)	Minimum	—	1	—	—	—
	Mean±SD	—	1.97±1.02	—	—	—
	Maximum	—	5	—	—	—
Timing Groups	Early (≤1 day)	63	—	43.44	—	—
	Late (>1 day)	82	—	56.56	—	—
Mortality by Timing	Early (≤1 day)	63	Death: 0	0	0.048	Fisher's exact
			Non-death: 63	100		
	Late (>1 day)	82	Death: 3	3.65		
			Non-death: 79	96.35		
Rebleeding by Timing	Early (≤1 day)	100	Yes: 18	18.00	0.003	Chi-square
			No: 82	82.00		
	Late (>1 day)	45	Yes: 6	13.3		
			No: 39	86.7		

Discussion:

We aimed to determine the Clinical and Endoscopic profile of Upper Gastrointestinal bleeding (UGIB) among patients presenting to a tertiary centre in northern India.

The present study demonstrated that the mean age of patients presenting with upper gastrointestinal bleeding (UGIB) was 51.55 ± 15.01 years, with a clustering in the fourth to sixth decades, and a marked male predominance (69%). This age distribution is consistent with multiple Indian studies, including those by Surendran et al10, Anshul et al11, and Kumar et al12, where the mean age ranged between 45–55 years. Similarly, studies from other developing nations such as those by Laine et al13 and Loperfido et al14 also report comparable age groups, although with slightly higher mean ages in Western populations.

The male predominance observed in this study is also widely reported, with ratios ranging from 2:1 to 4:1 in studies by Dewan et al15, Rockall et al16 and Tielleman et al17. This gender disparity is largely attributed to higher prevalence of alcohol consumption, smoking, and occupational stress among males in developing countries. Western data suggest a narrowing gender gap, possibly due to increasing NSAID use and aging populations among females. The relatively younger age in the present cohort highlights the early onset of risk factors such as alcohol use and chronic liver disease in the Indian population, which has important socioeconomic implications.

In the present study, melena (72.4%) was the most common presentation, followed by hematemesis (51.7%), with a significant proportion presenting with both. Additionally, 24.1% of patients were hemodynamically unstable at admission. These findings are consistent with studies by Singh et al18, Barkun et al19, and Hearnshaw et al20, where melena was the predominant presentation in 60–75% of cases. The coexistence of hematemesis and melena reflects ongoing or severe bleeding, often associated with variceal sources.

Hemodynamic instability at presentation is a well-established predictor of poor outcomes. Studies by Rockall et al16 and Blatchford et al21 demonstrated that shock at presentation significantly increases mortality and rebleeding rates. The proportion of unstable patients in the present study is comparable to that reported by Dewan et al15 (20–30%). This emphasizes the importance of early resuscitation, triage, and ICU-level monitoring in UGIB management.

Among risk factors, alcohol consumption showed a strong association with variceal bleeding ($p = 0.001$), while smoking was also significantly associated ($p = 0.028$). NSAID use contributed to non-variceal etiologies. These findings are strongly supported by studies from India and Asia. Sarin et al22 and Garcia-Tsao et al23 have consistently identified alcohol-induced cirrhosis as the leading cause of portal hypertension and variceal bleeding in developing countries. Similarly, studies by Peura et al24 and Lanas et al25 have shown NSAIDs to be a major contributor to peptic ulcer-related bleeding in non-variceal UGIB. The association of smoking with UGIB has been reported by Katschinski et al26, where smoking increases gastric mucosal vulnerability and delays ulcer healing. The high burden of liver disease in this study underscores the epidemiological transition in UGIB etiology in India, with variceal bleeding overtaking peptic ulcer disease.

The present study demonstrated a predominance of variceal bleeding, followed by peptic ulcer disease and erosive gastritis. This is in contrast to Western studies, such as those by Laine et al13 and Hearnshaw et al20, where peptic ulcer disease accounts for 40–60% of cases. However, Indian studies by Dewan et al15, Rathi et al27, and Sarin et al22 have reported a similar predominance of variceal bleeding, ranging from 45–70%.

Patients with variceal bleeding showed more pronounced abnormalities in hemoglobin, albumin, and coagulation profile, reflecting underlying hepatic dysfunction. Such laboratory derangements have been widely reported as predictors of adverse outcomes, including mortality and rebleeding20,21,23.

Mortality in the present study was relatively low (~2–3%), but significantly associated with hemodynamic instability, low haemoglobin, presence of ascites and encephalopathy. These findings are consistent with global literature, where shock at presentation and liver failure markers are key predictors of mortality17,18,20.

Rockall score demonstrated significant association with rebleeding and mortality. This validates its utility as a risk stratification tool in this population. Similar findings have been reported in European and Asian studies evaluating UGIB scoring systems.

One of the most significant findings of this study was zero mortality with early endoscopy (≤24 hours), increased mortality (3.65%) with delayed endoscopy, significant association with rebleeding, transfusion, hospital stay. These findings are strongly supported by studies by Barkun et al19, Laine et al13, and Hearnshaw et al20, which emphasize early endoscopy as the most important modifiable factor in UGIB outcomes. Delayed endoscopy has been consistently associated with increased complications and resource utilization.

Conclusion: We observed that the cohort represented a middle-aged, predominantly male population with frequent alcohol use and limited cardiometabolic comorbidity. Presentation often involved Haematemesis or Melena and one-quarter arrived with circulatory instability. Laboratory values showed anaemia and mild coagulopathy that reflected chronic Liver dysfunction in many cases. Variceal bleeding predominated, while peptic ulcer Disease accounted for most non-Variceal events. Cirrhosis-related features such as ascites and hypoalbuminemia were widespread and linked with poorer Haemodynamic and biochemical profiles. These patterns established the Clinical burden of chronic Liver Disease as the dominant risk context and supported the aim of mapping UGIB aetiology in this region.

Clinical implications relate to prioritising rapid endoscopy for suspected Variceal bleeding and reinforcing early resuscitation for unstable presentations. The predominance of alcohol-related Liver Disease indicated a public health gap; preventive measures and earlier cirrhosis detection would likely reduce UGIB 68 admissions. Scoring systems such as Rockall provided useful stratification for resource allocation and should be integrated into routine practice.

Research gaps remain in understanding long-term recurrence, post-discharge mortality, and comparative outcomes of specific Endoscopic modalities. Future studies should examine cost-effectiveness of early endoscopy, assess outcomes after discharge, and explore regional variations in aetiology with larger samples and multicentre design.

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