Etiology of Upper Gastrointestinal Bleeding: A Five-Year Study at a Tertiary Hospital

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ABSTRACT

Background: *Upper Gastrointestinal bleeding is a common medical condition requiring prompt treatment and endoscopic evaluation. Identifying the causes is crucial for enhancing patient outcomes and guiding clinical decisions. This study aims to evaluate the etiologies of hematemesis and melena over the past five years.*

Methods: *This study analyzed patient records retrospectively who underwent upper gastrointestinal endoscopy at the Gastrointestinal Endoscopy Center in Cipto Mangunkusumo Hospital, Jakarta, Indonesia between 2019 and 2023. Statistical analysis was performed using SPSS version 26.0.*

Results: *Between 2019 and 2023, 5,721 patients underwent upper gastrointestinal endoscopy, with 1,090 (19.1%) due to upper gastrointestinal bleeding. Among these, 593 were male (54.4%) and 497 were female (45.6%), with a mean age of 54.4 ± 15.12 years. The largest age group affected was 40-59 years, comprising 451 cases (41.4%). Of the 1,090 patients, 262 (24%) presented with hematemesis, 654 (60%) with melena, and 174 (16%) with both symptoms. Non-variceal bleeding was identified in 913 cases (83.8%), while variceal causes accounted for 177 cases (16.2%). Erosive gastritis was the leading cause of upper GI bleeding (408 cases, 37.4%), followed by peptic ulcers (270 cases, 24.8%). Among peptic ulcer cases, 136 (50.4%) were located in the stomach. Additionally, cancer was a cause in 104 cases (9.5%), with duodenal cancer being the most common (48 cases, 46.2%).*

Conclusion: *This study identified erosive gastritis as the leading cause of upper gastrointestinal bleeding, followed by peptic ulcers and varices.*

Keywords: *Endoscopy, Hematemesis, Melena, Upper Gastrointestinal Bleeding*

ABSTRAK

Latar Belakang: *Perdarahan saluran cerna bagian atas merupakan kondisi medis yang umum dan memerlukan penanganan segera serta evaluasi endoskopi. Identifikasi penyebab perdarahan sangat penting untuk meningkatkan luaran pasien dan membantu pengambilan keputusan klinis. Studi ini bertujuan untuk mengevaluasi etiologi hematemesis dan melena selama lima tahun terakhir.*

Metode: *Penelitian ini merupakan studi retrospektif terhadap data rekam medis pasien yang menjalani endoskopi saluran cerna atas di Pusat Endoskopi Saluran Cerna, Rumah Sakit Cipto Mangunkusumo, Jakarta, Indonesia, pada periode 2019 hingga 2023. Analisis statistik dilakukan dengan SPSS 26.0.*

Hasil: *Selama tahun 2019 hingga 2023, sebanyak 5.721 pasien menjalani endoskopi saluran cerna atas, dengan 1.090 kasus (19,1%) disebabkan oleh perdarahan saluran cerna bagian atas. Dari jumlah tersebut, 593 pasien (54,4%) berjenis kelamin laki-laki dan 497 (45,6%) perempuan, dengan rerata usia 54,4 ± 15,12 tahun.*

Kelompok usia terbanyak adalah 40–59 tahun, yaitu sebanyak 451 kasus (41,4%). Dari 1.090 pasien, sebanyak 262 pasien (24%) datang dengan hematemesis, 654 pasien (60%) dengan melena, dan 174 pasien (16%) dengan kedua gejala tersebut. Perdarahan non-variseal ditemukan pada 913 kasus (83,8%), sementara penyebab variseal ditemukan pada 177 kasus (16,2%). Gastritis erosif merupakan penyebab tersering perdarahan saluran cerna atas (408 kasus, 37,4%), diikuti oleh ulkus peptikum (270 kasus, 24,8%). Dari kasus ulkus peptikum, 136 kasus (50,4%) berlokasi di lambung. Selain itu, kanker ditemukan sebagai penyebab pada 104 kasus (9,5%), dengan kanker duodenum sebagai jenis terbanyak (48 kasus, 46,2%).

Kesimpulan: *Studi ini menunjukkan bahwa gastritis erosif merupakan penyebab utama perdarahan saluran cerna bagian atas, diikuti oleh ulkus peptikum dan varises.*

Kata kunci: *Endoskopi, Hematemesis, Melena, Perdarahan Saluran Cerna Atas*

INTRODUCTION

Gastrointestinal bleeding remains one of the most critical gastrointestinal conditions requiring immediate resuscitation and rapid intervention. It is generally classified into two main types: upper and lower gastrointestinal bleeding. Upper gastrointestinal bleeding originates from sites located above the ligament of Treitz, including the esophagus, stomach, and duodenum, and it is frequently encountered in emergency departments, often caused by eso-gastro-duodenal lesions.[1–3]

The causes of upper gastrointestinal bleeding (UGIB) can be broadly divided into variceal and non-variceal etiologies, with non-variceal sources being responsible for the majority of severe cases. Common non-variceal causes include peptic ulcer disease, gastritis, duodenitis, and esophagitis. Additionally, conditions such as angiodysplasia, Mallory-Weiss tears, malignancy, and gastric antral vascular ectasia may also contribute to UGIB. Despite advancements in treatment, including the widespread use of proton pump inhibitors (PPIs) and *Helicobacter pylori* eradication therapy, peptic ulcer bleeding continues to be the primary causes of UGIB [1,4]

Patients presenting with UGIB often arrive at the emergency department with alarming symptoms such as hematemesis and melena. Hematemesis refers to vomiting fresh red blood, while melena is characterized by the passage of black, tarry stools. Alongside these visible signs, patients may exhibit systemic symptoms caused by blood loss, including dizziness, fatigue, and shortness of breath.[1,2]

Although a thorough clinical history and physical examination can offer valuable insights about the source of bleeding, definitive diagnosis requires direct visualization through endoscopy. In a previous study conducted between 2001 and 2005 at the Endoscopy Unit, Department of Internal Medicine, Cipto Mangunkusumo Hospital in Jakarta, Indonesia, it was reported that 20.15% of patients underwent endoscopy due to UGIB. The persistent high incidence of UGIB is likely linked to the increasing use of non-steroidal anti-inflammatory drugs (NSAIDs), as well as anti-thrombotic medications, which are known risk factors.[1,5] This study aims to evaluate the causes of hematemesis and melena over the past five years.

METHODS

This retrospective study examined medical records of patients who underwent upper gastrointestinal endoscopy over a five-year period, from 2019 to 2023, at the Gastrointestinal Endoscopy Center, Division of Gastroenterology, Pancreatology, and Endoscopy, Department of Internal Medicine, Cipto Mangunkusumo Hospital, Jakarta, Indonesia, using a total sampling method, in which all eligible patients within the study period were included. Inclusion criteria were adult patients (aged >18 years) who underwent endoscopy with an indication of hematemesis and/or melena. Patients were excluded if their medical records were incomplete, if they underwent endoscopy for other indications, or if they were under 18 years of age. This study was approved by the Ethics Committee of the Faculty of Medicine, Universitas Indonesia-Cipto Mangunkusumo National Referral Hospital (No. KET-1818/UN2.F1/ETIK/PPM.00.02/2025). A total of 5,721 upper gastrointestinal endoscopies were performed during this period, and upper gastrointestinal bleeding (UGIB) was the indication for 1,090 cases, accounting for 19.1% of all procedures.

The study focused on patients presenting with UGIB symptoms, specifically hematemesis, melena, or a combination of both. Key factors analyzed included patient demographics (age and sex), indications for the procedure, and endoscopic

findings. Endoscopy was utilized to assess the esophageal, gastric, and duodenal mucosa, and diagnoses were established based on the OMED criteria.

The endoscopic assessment involved carefully examining the luminal content for signs such as fresh blood, clots, hematin, or a clear lumen. Mucosal examinations focused on identifying various lesions, including protruding, flat, or excavated ones, as potential sources of bleeding. In patients presenting with upper gastrointestinal bleeding, any lesion identified on endoscopy, including erosive gastritis, was considered a potential source of bleeding. The esophageal varices were classified based on their size and shape using a modified Paquet classification. Grade I varices were small, straight, and disappeared with insufflation. Grade II varices were larger, clearly visible, and usually straight, without disappearing on insufflation, whereas Grade III varices were more prominent, tortuous or coil-shaped, and partially occupied the esophageal lumen. Grade IV varices were markedly enlarged, tortuous, grape-like varices occupying most of the esophageal lumen.[6]

Ulcer evaluations involved examining their number, form, and presence of bleeding stigmata, which were categorized according to the FORREST classification. Active bleeding was classified as Forrest IA (spurting hemorrhage) and Forrest IB (oozing hemorrhage). Signs of recent bleeding were categorized as Forrest IIA (non-bleeding visible vessel), Forrest IIB (adherent clot), and Forrest IIC (flat pigmented spot). Ulcers with a clean base were classified as Forrest III.[7]

The assessment of gastric mucosa involved evaluating both the luminal content and the condition of the mucosa itself. Portal hypertensive gastropathy was identified by distinct features, including a mosaic-like pattern, scarlatina-like pattern, and the presence of cherry red spots. If the bleeding source could not be identified, it was recorded as "not found," indicating that no bleeding source was detected during the evaluation.

Statistics or analysis or statistical analyses

Statistical software SPSS 26.0 was used to conduct descriptive data analysis, focusing on age distribution, age groupings, sex, indications, and different endoscopic findings.

RESULTS

Between 2019 and 2023, 1,090 (19.1%) out of 5,721 patients at Cipto Mangunkusumo Hospital underwent upper gastrointestinal endoscopy due to upper gastrointestinal bleeding. The patient population consisted of 593 men (54.4%) and 497 women (45.6%), with an average age of 54.4 ± 15.12 years. The age group most affected was 40-59 years, which accounted for 451 cases (41.4%), followed by those over 60 years (445 cases, 40.8%) and individuals under 40 years (194 cases, 17.8%). Hematemesis was reported in 262 patients (24%), melena in 654 patients (60%), and both symptoms were present in 174 patients (16%).

As shown in **Table 1**, non-variceal bleeding was the predominant cause of upper gastrointestinal bleeding, accounting for 913 cases (83.8%), while variceal bleeding was observed in 177 cases (16.2%). Erosive gastritis was the primary cause, identified in 408 cases (37.4%) through endoscopy. This was followed by peptic ulcers in 270 patients (24.8%) and varices in 177 cases (16.2%). Cancer remained a significant contributor, responsible for 104 cases (9.5%). Other findings included esophagitis in 63 patients (5.8%), polyps in 27 cases (2.5%), and portal hypertensive gastropathy in 5 cases (0.5%). Less common causes such as diverticula, telangiectasia, and hemangioma were detected in 2 patients each (0.2%). Interestingly, no abnormalities were found during endoscopy in 30 patients (2.8%) who presented with symptoms of upper gastrointestinal bleeding.

Table 1. The Etiologies of Upper GI Bleeding in Patients Based on Endoscopy

Diagnosis	Number of Patients (n)	Percentage (%)
Erosive Gastritis	408	37.4
Peptic Ulcer	270	24.8
Varices	177	16.2
Cancer	104	9.5
Esophagitis	63	5.8
Polyp	27	2.5
Porta Hypertension Gastropathy	5	0.5
Diverticulum	2	0.2
Telangiectasia	2	0.2
Hemangioma	2	0.2
Not Found	30	2.8
TOTAL	**1090**	**100.0**

Among the 270 cases of ulcer-related bleeding, 195 (72.2%) were classified as grade III **(Table 2),** making it the most common finding. Grade II ulcers were identified in 35 patients (13.0%), while grade I ulcers appeared in 14 cases (5.2%). Healing ulcers were noted in 26 cases (9.6%). The majority of these ulcers were

located in the stomach, with 136 cases (50.4%), and 94 (34.8%) in the duodenum, while 10 (3.7%) were located in the esophagus **(Table 3).** Additionally, there were 28 documented cases (10.4%) where ulcers were present in both the stomach and duodenum. There was also one case each where ulcers were simultaneously found in the esophagus and duodenum, as well as in the stomach and duodenum.

Table 2. Ulcer Grading According to the Forrest Classification Evaluated by Endoscopy

Ulcer Grade (Forrest Classification)	Number of Patients (n)	Percentage (%)
Grade I	2	0.7
Grade IA	12	4.5
Grade IIA	7	2.6
Grade IIB	11	4.0
Grade IIC	17	6.4
Grade III	195	72.2
Healing Ulcer	26	9.6
TOTAL	**270**	**100.0**

Table 3. Location of Peptic Ulcer

Location of Ulcer	Number of Patients (n)	Percentage (%)
Esophagus	10	3.7
Stomach	136	50.4
Duodenum	94	34.8
Esophageal and Stomach	1	0.4
Esophagus and Duodenum	1	0.4
Stomach and Duodenum	28	10.4
TOTAL	**270**	**100.0**

Table 4 shows that grade 3 esophageal varices were the most commonly observed varices during endoscopy among patients with hematemesis and melena, accounting for 78 cases (44.1%). Following closely were grade 2 esophageal varices with 58 cases (32.8%), grade 1 with 21 cases (11.9%), and grade 4 with only 2 cases (1.1%). Additionally, gastric varices were found to be responsible for upper gastrointestinal bleeding in 16 cases (9.0%) within this study. There were also 2 cases (1.1%) of obliterated varices observed.

Table 4. Type and Grade of Varices in Patients Evaluated by Endoscopy

Type of Varices	Number of Patients (n)	Percentage (%)
Grade 1 Esophageal Varices	21	11.9
Grade 2 Esophageal Varices	58	32.8
Grade 3 Esophageal Varices	78	44.1
Grade 4 Esophageal Varices	2	1.1
Gastric Varices	16	9.0
Obliterated Varices	2	1.1
TOTAL	**177**	**100.0**

Both cancer and polyps were identified as causes of upper gastrointestinal bleeding in patients evaluated through endoscopy **(Table 5 and Table 6),** with 104 cases attributed to cancer and 27 cases to polyps. Among cancer cases, the duodenum was the most common site, accounting for 48 cases (46.2%), closely followed by the stomach at 46 cases (44.2%). Similarly, polyps were predominantly found in the stomach, observed in 18 cases (66.7%), followed by the duodenum with 7 cases (25.9%) and the esophagus with 2 cases (7.4%).

Table 5. Type of Cancer in Patients Evaluated by Endoscopy

Type of Cancer	Number of Patients (n)	Percentage (%)
Esophagus	10	9.6
Stomach	46	44.2
Duodenum	48	46.2
TOTAL	**104**	**100.0**

Table 6. Type of Polyp in Patients Evaluated by Endoscopy

Type of Polyp	Number of Patients (n)	Percentage (%)
Esophagus	2	7.4
Stomach	18	66.7
Duodenum	7	25.9
TOTAL	**27**	**100.0**

DISCUSSION

The demographic distribution reveals a slightly higher prevalence of UGIB in men (54.4%) than in women, consistent with findings from Syam et al. previously, which reported a male predominance of 66.3%. Similar patterns have been observed in research by Hreinsson et al. in Iceland and Sadiku et al. in Albania.[5,8,9]

Regarding age, the most affected group in this research is 40–59 years, followed closely by individuals above 60 years. This trend aligns with prior research linking UGIB to an aging population. For instance, Menichelli et al. reported that 70% of UGIB cases occurred in individuals older than 60. However, unlike previous reports, this study demonstrates a predominance in a relatively younger age group, with most cases occurring between 40–59 years. This shift may be related to findings from an Indonesian pharmacy study, where 44% of anti-inflammatory drug users were aged 45–59 years. This raises the possibility that medication use in this demographic may contribute to the earlier onset of UGIB compared to other populations.[10,11]

Erosive gastritis emerged as the leading cause of UGIB in this study (37.4%), followed by peptic ulcer disease (24.8%) and varices (16.2%). This finding

indicates a notable shift from earlier studies, where varices were the predominant cause, contributing to 33.5% of cases. Similarly, a study conducted at the National University Hospital Singapore reported that varices accounted for 8.03% of UGIB cases based on endoscopic evaluations, further reflecting this evolving trend.[5,12]

Variceal bleeding continues to be a leading cause of mortality in individuals with cirrhosis, which is frequently associated with conditions such as nonalcoholic fatty liver disease, alcoholic liver disease, and chronic hepatitis B or C. In Indonesia, this observed shift may be attributed to changes in hepatitis B endemicity. Studies on the prevalence of Hepatitis B surface antigen indicate that the country has transitioned from high to moderate endemicity. This improvement is largely due to public health initiatives, including widespread neonatal immunization and routine screening programs. These initiatives have likely reduced the prevalence of variceal bleeding, shifting attention to non-variceal causes like erosive gastritis and peptic ulcer disease.[13–16]

In the present study, peptic ulcer disease was not the leading cause, as erosive gastritis accounted for a higher proportion of cases. The number of peptic ulcer disease in this study (24.8%) is lower compared to the 40% reported in Hreinsson et al.'s research. However, it is similar to findings from the previous 2001–2005 study in Cipto Mangunkusumo Hospital, which recorded a prevalence of 26.8%. Additionally, this figure aligns closely with a study conducted in Albania, where ulcers (both gastric and duodenal) were observed in 29.2% of patients. However, these findings differ from studies conducted at Dr. Doris Sylvanus Regional General Hospital and Ibnu Sina Makassar Hospital, where peptic ulcer disease was reported as the leading cause of upper gastrointestinal bleeding, accounting for 20.64% and 35.5% of cases, respectively, although the proportions are relatively comparable to those observed in this study. [8,9,17,18]

Cancer was responsible for 9.5% of UGIB cases in this study, with an almost equal distribution between duodenal and gastric cancers. This rate is significantly higher than findings by Kiattiweerasak et al. in Thailand, where gastric cancer was reported in only 0.96% of 20,981 patients undergoing upper GI endoscopy. However, it aligns more closely with the study by Hreinsson et al., which reported incidences of gastric cancer, esophageal cancer, and GIST at 2.6% each. These findings underscore the importance of early detection of gastrointestinal malignancies, particularly through targeted screening in high-risk populations.[8,19]

The possibility of overestimating erosive gastritis as the etiology of bleeding should be considered. Although erosive gastritis may be identified during endoscopy, it does not necessarily represent the primary bleeding lesions. This is because other sources may have been missed, already healed, or not detectable at the time of examination, particularly if endoscopy was not performed during active bleeding. This is supported by the finding that a small proportion of patients presenting with hematemesis and/or melena had no identifiable abnormalities on endoscopic evaluation (2.8%), which may indicate either resolution of bleeding lesions or limitations in detection after bleeding has ceased.

The interpretation of these findings is further constrained by the lack of detailed clinical parameters, including baseline hemoglobin levels and the timing of endoscopy relative to the bleeding episode. These limitations make it difficult to accurately attribute bleeding to specific lesions and to differentiate between active, recent, or resolved hemorrhage.

Nevertheless, there are several limitations to this research. The descriptive design was largely influenced by incomplete data availability, particularly for cases prior to 2020, when comprehensive hospital medical records were not consistently accessible. As a result, this study primarily utilized data from the endoscopy center database, which did not uniformly capture detailed clinical and risk factor information required for more in-depth analytical evaluation. In addition, the absence of detailed risk factor data represents an important limitation, as it limits the ability to assess the contribution of key variables, such as nonsteroidal anti-inflammatory drug (NSAID) use, *Helicobacter pylori* status, and the use of antithrombotic or anticoagulant therapy, to gastrointestinal bleeding.[8,20]

Furthermore, as it was carried out at a national referral hospital, the findings may not be fully generalizable to rural or primary care settings, where patient demographics and risk factors might differ. To address this, future research should include multicenter studies to validate these findings and explore variations across diverse populations.

Overall, this study reflects dynamic shifts in UGIB etiology, influenced by changing societal behaviors and healthcare practices. Continued monitoring and reporting on UGIB trends are essential for adapting management strategies effectively.

CONCLUSION

A predominance of non-variceal causes was observed, with erosive gastritis and peptic ulcer disease accounting for the majority of upper gastrointestinal bleeding cases. This change is likely influenced by improvements in managing hepatitis B and increased use of anti-inflammatory medications. The role of endoscopy is crucial in accurately diagnosing and managing UGIB, enabling timely intervention and better patient care.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this article.

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AUTHOR CONTRIBUTIONS

Conceptualization and methodology, V.N.M, A.F.S ; Investigation, V.N.M, L.A ; Formal Analysis V.N.M, L.A ; Writing – original draft, V.N.M, L.A, A.F.S ; Writing – review and editing, V.N.M, L.A, A.F.S. All authors have read and agreed to the final version of the manuscript.

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The authors have nothing to declare.

DATA AVAILABILITY

The participants of this study did not give written consent for their data to be shared publicly, so supporting data is not available.

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