Gastroenterology, Hepatology & Digestive Disorders

Factors Associated with Mortality in Patients Admitted for Upper Gastrointestinal Bleeding at the Sourô Sanou University Hospital Center in Bobo-Dioulasso

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ABSTRACT

Introduction: *Upper gastrointestinal bleeding remains life-threatening for patients, with mortality rates dependent on early diagnosis and treatment. The aim of this study was to investigate the factors associated with mortality in patients admitted for upper gastrointestinal bleeding at the Sourô Sanou University Hospital Center in Bobo-Dioulasso.*

Methods: *This was a retrospective cohort study conducted from 1 January 2021 to 31 December 2023 in the Hepatology and Gastroenterology Department of the Sourô Sanou University Hospital. It included patients admitted for upper gastrointestinal bleeding with usable clinical records. Binary logistic regression was used as the method of analysis to identify associated factors. The significance threshold was set at 5%.*

Results: *During the study period, there were 303 cases of upper gastrointestinal bleeding, representing a prevalence of 16.9%, and the records of 291 patients were included. The median age was 50 years and the sex ratio was 2.6. The most common presentation was hematemesis in 82% of cases. The main etiologies identified were gastroduodenal peptic ulcer disease and esophageal variceal rupture in 54.3% and 24% of cases, respectively. The overall mortality rate from upper gastrointestinal bleeding was 20%, and the main factors associated with it were the presence of an underlying bacterial infection [aOR = 3.3; 95% CI (1.6-17.4)] and esophageal variceal rupture [aOR = 6.8; 95% CI (1.3-37.4)], while hospitalization lasting more than 5 days was associated with better survival [aOR = 0.06; 95% CI (0.01-0.5)].*

Conclusion: *Upper gastrointestinal bleeding is common in our setting and is associated with high mortality. Improving patient prognosis requires effective infection control and effective treatment of esophageal varices.*

Keywords

Associated factors, Mortality, Upper gastrointestinal bleeding, Peptic ulcer, Esophageal variceal rupture, Sourô Sanou University Hospital.

Introduction

Upper gastrointestinal bleeding (UGIB) is a common and potentially fatal medical and surgical emergency requiring effective resuscitation and monitoring. It causes significant

mortality worldwide. Prevalence and clinical presentations vary depending on the state of development of practices in different regions and the availability of technical facilities [1,2].

In developed countries, particularly in Europe and the United States, a 15-40% decline in incidence has been observed over the last three decades [3]. However, despite improvements in therapeutic techniques, the condition remains life-threatening, with mortality still estimated at around 5-10% [4].

In Africa, UGIB is often associated with high mortality rates due to various factors and specific characteristics related to the prevalence of certain underlying conditions [5]. Hospital prevalences ranging from 7.3% in Togo [6] to 6.7% in Mali [7], with respective mortality rates of 5% and 14.3%, have been reported.

In Burkina Faso, Sombié [2] reported in 2015 that gastroduodenal ulcer disease was the most common cause of hospitalization, accounting for 52.3% of cases with a 17% mortality rate at the Yalgado Ouédraogo University Hospital Center. Kinda reported a hospitalization rate of 11.5% and an overall mortality rate of 12.8% in a 2021 study on gastrointestinal bleeding at the Sourô Sanou University Hospital Centre (SSUHC) in Bobo-Dioulasso [8]. A review of the literature on European series identified the presence of comorbidities and advanced age as factors associated with mortality in UGIB [9]. Meanwhile, some African authors have reported bacterial infection, hemodynamic shock, liver failure, and low haemoglobin levels as factors associated with mortality [2,10-13]. While several studies have described the profile of patients with UGIB, few have analyzed the factors associated with mortality. Understanding the factors associated with the high mortality rates reported in African studies is essential for improving management strategies. This study aimed to identify these factors in patients admitted to SSUHC for UGIB, to better guide therapeutic interventions and prevention.

Methods
Study Setting
The study was conducted in the Hepatology and Gastroenterology (HGE) Department of the Sourô Sanou University Hospital Center in Bobo-Dioulasso. The SSUHC is the referral center for western Burkina Faso, serving the health regions of Hauts-Bassins, Cascades, Sud-Ouest and Boucle du Mouhoun.

Type and Period of Study
This was a retrospective cohort study conducted from 1 January 2021 to 31 December 2023, i.e. a study period of 36 months.

Study Population and Sampling
During the study period, the records of male and female patients admitted to the Hepatology and Gastroenterology Department for upper gastrointestinal bleeding and with complete, usable clinical records were included. Sampling consisted of an exhaustive review of available records. All patient records meeting the study criteria were included.

Study Variables
The study variables were grouped into five main categories: sociodemographic data (age, gender, place of residence and occupation), clinical data (mode of admission, patient history, methods of UGIB detection, physical signs on admission, and presence or absence of shock on admission), paraclinical data (hemoglobin and creatinine levels, and upper gastrointestinal endoscopy results), therapeutic data (initial non-specific treatment, specific medical treatment, and surgical treatment) and progressive data (length of hospitalization, mode of discharge, recurrence or absence of recurrence, and occurrence or absence of complications during hospitalization).

Data Collection Techniques and Tools
Data collection was carried out using a structured form developed with Epi-info and consisted of a review of the hospitalization register and clinical records of patients hospitalized in the HGE Department during the study period.

Statistical Analysis of Data
Statistical analysis was performed using STATA software version 14. Quantitative variables were measured by their means or medians, accompanied by their standard deviations, and qualitative variables by their proportions. A univariate logistic regression was used to select independent covariates with a p-value of less than 20%. A stepwise downward multivariate logistic regression was then performed to determine the factors associated with in-hospital mortality due to UGIB. The significance threshold was set at 5%.

Ethical Considerations
The agreement of the representatives of the SSUHC Institutional Ethics Committee was obtained prior to the start of the study. Data collection was carried out in accordance with patient anonymity and the confidentiality of their information. Thus, only the medical record number was reported. No names or information that could identify a patient were mentioned. The data were used for this study only.

Results
During the study period, 1,791 patients were admitted to the HGE Department of SSUHC, including 303 patients for UGIB, representing an overall hospital prevalence of 16.9%. The usable records of 291 patients were included.

Sociodemographic Characteristics
The mean age of patients was 50 ± 1.02 years, with extremes of 36 and 63 years. The *sex ratio* was 2.6. The various characteristics of our patients are detailed in Table 1.

Clinical and Biological Data
The majority of patients, 255 (87.6%), were evacuated in an emergency situation. The main symptom was hematemesis (82%), followed by melena (54%); abdominal pain and dizziness were reported in 108 patients (37%). The mean total Rockall score was 2.8 ± 1.4, ranging from 0 to 8 (Table 2).

Table 1: Patients characteristics (N = 291).

Variables	n	%
Sociodemographic characteristics Gender Male Female	210 81	72.2 27.8
Main occupation Informal sector Farmer	150 86	51.6 29.6
Employee	31	10.6
Housewife	17	5.8
Student	7	2.4
Place of residence Urban Rural	161 130	55.3 44.7
Medical history and lifestyle		
Gastroduodenal ulcer disease	58	20
Viral Hepatitis	39	13
Hypertension	35	12
Cirrhosis		10
Risky behaviors		
Alcohol consumption	65	23
Smoking	45	16
Taking non-steroidal anti-inflammatory drugs	35	12

Table 2: Distribution of the various clinical and biological signs in patients.

Variables	n	%
Disturbed consciousness	22	7.6
Clinical anemia	191	68.2
Jaundice	36	12.4
Unstable hemodynamic status	115	39.5
Edema-ascitic syndrome	36	12.4
Hepatomegaly	40	13.8
Hemoglobin level (g/dL) < 7 [7-10] [10-14] > 14	142 74 34 16	53.4 27.8 12.8 6.0
Hematocrit level (%) < 20 [20-30] [30-45] > 45	123 89 46 8	46.2 33.5 17.3 3.0
Rockall score [0-2] < 2	82 80	50.6 49.4

Causes of Upper Gastrointestinal Bleeding

Among the 162 (55.7%) patients who underwent upper gastrointestinal endoscopy, the examination was normal in 20.4% of patients (n = 33). UGIB was mainly due to gastric and/or duodenal ulcer (43.2%) and esophageal variceal rupture (19.1%). Table 3 below shows a breakdown of the etiologies of UGIB visualized by upper gastrointestinal endoscopy.

Table 3: Distribution of the main etiologies of upper gastrointestinal bleeding among patients who underwent upper gastrointestinal endoscopy.

Variables	n	%
Gastric and/or duodenal ulcer	70	43.2
Ruptured esophageal varices	31	19.1
Gastropathies	23	14.2
Gastric dysmitosis	3	1.9
Mallory Weiss syndrome Normal upper gastrointestinal endoscopy	2 33	1.2 20.4
Total	162	100

Progressive data

The median length of hospital stay was five days, with an interquartile range of three to eight days. There were 58 deaths, representing a case fatality rate of 20%.

Factors Associated with Mortality

In the univariate analysis, sociodemographic factors and medical histories associated with mortality (p < 0.2) included age over 25 years, viral hepatitis, cirrhosis, and non-steroidal anti-inflammatory drug use. Clinical and paraclinical factors associated with death included the presence of jaundice, edema, ascites and hepatomegaly (p < 0.2). Therapeutic and progressive factors associated with mortality were an underlying bacterial infection, shock and length of hospitalization.

Multivariate analysis revealed that a hospitalization time of more than five days was protective [aOR = 0.06; 95% CI (0.01–0.5)] whereas underlying bacterial infection [aOR = 3.3; 95% CI (1.6–17.4)] and esophageal variceal rupture [aOR = 6.8; 95% CI (1.3–37.4)] were risk factors associated with mortality (Table 4).

Table 4: Factors associated with mortality in multivariate regression.

Variables	n	Adjusted OR (CI 95%)	p
Hospitalization time (days)			
[0-3]	95	1	
[3-5]	68	0.6 (0.1-3.5)	0.54
>5	127	**0.06 (0.01-0.5)**	**0.01**
Presence of bacterial infection			
No	128	1	
Yes	163	**3.3 (1.6-17.4)**	**0.04**
Etiologies			
Gastric and/or duodenal ulcer	70	1	
Ruptured esophageal varices	31	**6.8 (1.3-37.4)**	**0.02**
Others	28	2.5 [0.3-20.5]	0.38

OR: odds ratio; CI: confidence interval.

Patients who had an infection requiring antibiotic treatment were 3.3 times more likely to die than those who did not require treatment (p = 0.04). Patients whose haemorrhage was caused by esophageal variceal rupture (REV) were 6.8 times more likely to die than those with other causes of haemorrhage (p = 0.02). Patients hospitalized for more than 5 days had a 94% reduction in the risk of death (p = 0.01).

Discussion

Limitations of the study

The limitations of this study are mainly due to the use of a manual system. This may have resulted in the hospitalization cases and variables recorded in the consultation registers and patient medical records used for data collection being incomplete. However, the results obtained have enabled the discussion below to be conducted.

Prevalence of Upper Gastrointestinal Bleeding

The prevalence of upper gastrointestinal bleeding (16.9%) during our study was comparable to that found by Kinda [8] in 2021 in Bobo-Dioulasso (17.9%). However, it remains lower than that reported by Saba [14] in 2019 in Ouagadougou (27.6%). This difference in frequency could be explained by improved access to care through decentralized management of certain cases in district hospitals and private health centers. This limits medical evacuations to tertiary centers or referral hospitals. Prevalence is declining significantly in developed countries due to better control of viral hepatitis through universal hepatitis B vaccination and effective pan-genotypic treatment of hepatitis C, thereby reducing the progression to cirrhosis and its complications [15]. In Sub-Saharan Africa [16], we also noted a slight decrease in the frequency of UGIB reported during the study period, likely reflecting the overall improvement in health and care systems, with more specialists available, enabling better diagnosis. Despite this decline, the frequency of UGIB remains high, probably due to self-medication with non-steroids anti-inflammatory drugs (NSAIDs) and the still high prevalence of viral hepatitis and cirrhosis, which are sources of esophageal varices [6].

Patient Characteristics

In our study, the median age of patients was 50 years. Similar results have been reported by some authors in Africa, with median ages ranging from 42 to 54 years [11,15,17,18]. This could be explained by the causes of UGIB in Africa, which are gastric and/or duodenal ulcer (GDU) and ruptured esophageal varices (REV). GDU is a condition that affects young adults (average age 46.2 years) in their fifties. REV is also a corollary of cirrhosis, a consequence of endemic chronic viral hepatitis, which also occurs at a young age. The average ages reported by authors in the West [19] are over 60 years. This reflects the ageing of their populations, often associated with comorbidities and regular use of NSAIDs and aspirin.

Our study reports a male predominance with a sex ratio of 2.6, consistent with data in the literature [2,15,20]. There is a link between the male predominance and the etiologies of UGIB; indeed, in the literature, GDU is a condition that mainly affects males, who are more exposed to certain risk factors in our context (alcoholism, smoking); the same is true for cirrhosis [2,16,21,22].

Hematemesis was the main mode of presentation in our series, accounting for 82% of cases. This is the most commonly reported mode of presentation of UGIB in most African studies [2,6,8,15]. Signs of hemodynamic shock were reported in 39.5% of patients. Obeidat, et al. [23], in a meta-analysis, reported a proportion of hemodynamic instability between 22% and 25% at patient admission. Bhuyan, et al. [24] reported a frequency of 50% in an elderly population with more comorbidities.

The two most common causes were gastric and/or duodenal ulcers (43.2%) and esophageal variceal rupture (19.1%). This result overlaps with those found by Kinda [8] and Sombié [2] in Burkina Faso, Bagny [6] in Togo and Chaabane [25] in Tunisia, who all reported in their studies that gastroduodenal ulcer disease was the main cause of UGIB. This high frequency could be explained by the high prevalence of Helicobacter pylori infection in Africa, which is often asymptomatic and affects more than 50% of the population [26], and by the over-the-counter sale of NSAIDs, which encourages self-medication. As for esophageal variceal rupture, it is also reported in second place in several studies [11,27] from countries where the prevalence of viral cirrhosis is also high.

Therapeutic and Evolutionary Characteristics

Nearly half of our patients (46.4%) received a blood transfusion. Higher proportions of transfusion cases were reported by Kinda [8], Ntagirabiri [27] and Dicko in Mali [7], with 63.4%, 63.9% and 61.9% of cases respectively. Improvements in the supply system for labile blood products, with the involvement of the highest state authorities, enabling rapid transfusion of patients in the emergency department, could explain the rate reported in our study. During hospitalization, 95.2% of patients (n = 277) received treatment based on proton pump inhibitors. These results thus corroborate the predominance of ulcerative disease, identified as the main etiology of UGIB in our series. No cases were treated with vasoactive substances or required haemostatic surgery. It should be noted that vasoactive drugs are geographically and financially inaccessible and that therapeutic and interventional endoscopy equipment is unavailable at the SSUHC.

Hemorrhagic recurrence during hospitalization was observed in 10% of patients. Lower results were reported by El Mekkaoui [28] in Tunisia (7.5%) and Dicko [7] in Mali (7.9%). The frequency of UGIB recurrence depends on the underlying pathology; it is common in cases of esophageal variceal rupture and depends on the quality of care [12]. The length of hospitalization observed in this study is comparable to that reported by Ntagirabiri [27], which was 6 days. Early digestive endoscopy in cases of upper gastrointestinal haemorrhage, once the patient's hemodynamic status has stabilized, allows for rapid and appropriate intervention and is thus associated with a reduction in hospitalization times, hemorrhagic recurrence and therefore deaths.

During hospitalization, 58 deaths were observed, representing a mortality rate of 20%. A high mortality rate of between 14% and 22% has been reported by other authors in sub-Saharan Africa [6-8,12,13,27], contrasting with the results of series from developed countries [15,25,28,29], which reported lower mortality rates of between 1.9% and 5.5%. This high mortality rate can be explained by: delays in consultation and treatment; the unavailability of endoscopic treatment for both active haemorrhages and preventive treatment of REV. The mean total Rockall score was 2.8, which

is close to the results reported by Sombié [2] and Zombré [30], which were 3.2 and 4.7 respectively. The Rockall score is used to assess the risk of death. However, the incompleteness of the data due to the lack of endoscopic results in some patients limits its interpretation in our context.

Factors Associated with Mortality in Multivariate Analysis

In our study, the factors associated with mortality were esophageal variceal rupture in cirrhotic patients, underlying bacterial infection, and hospitalization lasting more than five days.

Patients whose haemorrhage was caused by ruptured esophageal varices had a 6.8 times higher risk of death than those with other causes of haemorrhage. Indeed, it has been reported that patients with cirrhosis have a 3.6 times higher risk of mortality [9]. Zombré [30] also found in his study that REV was associated with mortality in UGIB patients. It is a cause of recurrent haemorrhage, which is also associated with mortality [10]. The lack of technical facilities for performing endoscopic haemostatic procedures is another cause.

Underlying bacterial infections were associated with a 3.3-fold increase in mortality risk in our study. Indeed, in immunocompromised cirrhotic patients, bacterial infections are additional sources of fragility and therefore death. Other African authors have also reported bacterial infection, hemodynamic shock, liver failure and low haemoglobin levels as factors associated with mortality [2,10-13]. Comorbidities and age have also been identified as factors associated with mortality in a review of the literature on European series [9]. Further studies are needed to assess the nature of bacterial infections and their specific impact on different subgroups of patients with upper gastrointestinal haemorrhage in our context.

In our study, hospitalization lasting longer than five days was associated with a better prognosis. Although prolonged hospital stays are often associated with higher mortality risks in patients [31], they also reflect successful hemodynamic stabilization and the completion of additional tests.

Conclusion

Upper gastrointestinal bleeding is still common in our setting. It primarily affects young adult males. It most often presents as hematemesis, and gastroduodenal ulcer disease is the main cause. The lack of endoscopy or vasoactive drug treatment contributes to the poor prognosis. Mortality remains high, with variceal bleeding and underlying bacterial infections being the main associated factors. Controlling viral hepatitis B and C, which cause cirrhosis, and improving access to vasoactive drugs and endoscopic hemostasis treatments could improve patients' prognoses.

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