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Frequency of In-Hospital Mortality in Patients with Upper Gastrointestinal Bleeding (UGIB) Due to Liver Cirrhosis

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ABSTRACT

Background: Upper Gastrointestinal haemorrhage is a common medical emergency, and a fatality in liver cirrhosis patients. The most common complication of portal hypertension in liver cirrhosis patients is esophageal variceal bleeding. This clinical survey was conducted to determine the mortality rate of cirrhotic patients with UGI bleeding in-hospital. In addition to those clinical presentations of patients, pre- and post-endoscopic findings, re-bleeding, and other outcomes were also studied during hospitalization.

Methods: This cross-sectional study employed a non-probability consecutive sampling technique to collect data over six months. A total of 202 patients were included in the sample, with a 95% confidence level and a 5% margin of error. Data were collected from participants meeting through clinical examination, endoscopy, and laboratory tests. Samples were analyzed for relevant parameters such as hemoglobin levels and bleeding source. All data was documented into pre-designed proformas, then the collected data was used to analyze it using SPSS Statistics 30.0.0.

Results: The main cause of UGIB in cirrhotic patients was rupture of esophageal and gastric varices. However, 70% of bleeding in the variceal bleeding group was due to esophageal, and 9.5% was dedicated to gastric varices. Whereas the UGI bleeding from non-variceal patients was due to peptic ulcer it was around 20.5% of total UGIB cirrhotic patients.

Conclusion: The findings revealed that variceal bleeders have a significant chance of rebleeding, and those patients have higher mortality chances than non-variceal bleeders. The proper clinical presentation of patients, their treatment, and management, including endoscopy and its outcomes, are critical to formulating the important guidelines for liver cirrhosis and UGI haemorrhage patients.

Keywords: Liver Cirrhosis, Variceal and Nonvariceal Bleeding, Esophageal and Gastric Varices; Peptic Ulcer Disease; Upper GI Hemorrhage (UGI).

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INTRODUCTION

Globally, upper gastrointestinal bleeding is a major medical emergency associated with significant morbidity, mortality, and healthcare costs. Its prevalence and management vary widely across regions, influenced by healthcare infrastructure, socioeconomic conditions, and underlying risk factors. In the developed world, peptic ulcer continues to be a major cause, which may be related to NSAID use or H. pylori infection. Despite recent breakthroughs in treatment options, it exhibits substantial morbidity and mortality. It is estimated to account for 1-2% of all acute admissions and is related to significant medical care expenses[1,2]. In most studies, the incidence of upper gastrointestinal bleeding ranges from 48 to 160 instances per 100,000 adults per year, with a death rate of 6-14 percent[3]. Patients with an upper gastrointestinal haemorrhage who received intensive early resuscitation had a lower fatality rate. Every episode of variceal haemorrhage has a mortality rate of 15-20% if it lasts longer than 6 weeks[4].

Upper gastrointestinal bleeds have different causes depending on the environment and socioeconomic condition[5]. Peptic ulcers account for 45-60% of hospitalizations for acute upper gastrointestinal bleeds in Western nations, followed by esophagitis and esophageal varices[6,7]. Nevertheless, numerous research findings show that the most prevalent causes of upper gastrointestinal bleeding are variceal haemorrhage and erosive gastritis[8]. As per the research data, Peptic ulcer disorders and esophageal varices were the leading causes of upper gastrointestinal bleeding[9].

Cirrhosis of the liver caused by chronic hepatitis is becoming more common, and there is a significant pool of undiagnosed people with hepatic cirrhosis and associated sequelae[10]. Similarly, no large-scale investigations on the prevalence of peptic ulcer disease in Pakistan are known[11]. The administration of UGIB is more challenging due to the lack of affordability on the side of patients and their attitude toward specialist health care[12]. Therefore, this study has been conducted to identify the frequency of mortality due to upper gastrointestinal bleeding in patients with cirrhosis. In this regard, this study aims to determine the in-hospital mortality rate of cirrhotic patients with upper gastrointestinal bleeding (UGIB) and analyze their clinical presentations, pre- and post-endoscopic findings, re-bleeding risk, and overall outcomes during hospitalization.

METHODS

This study employed a cross-sectional design conducted over six months at the Department of Medicine, Peoples Medical College Hospital, Nawabshah, Sindh, Pakistan. The study aimed to estimate the mortality rate in patients with upper gastrointestinal bleeding (UGIB) due to liver cirrhosis. The sample size was determined using Cochran's formula (see Eq. 1), based on an expected mortality rate of 4.4% in patients with UGIB due to liver cirrhosis. A 95% confidence level and a 2.2% margin of error were applied, resulting in a required sample size of 202 patients. A non-probability consecutive sampling technique was utilized to enroll participants who met the inclusion criteria during the study period.

To ensure the credibility and integrity of research outcomes, the study was reviewed and approved by the review committee and ethical board of Peoples Medical College Hospital, Nawabshah. Written informed consent was obtained from all participants before their inclusion in the study. Inclusion criteria: the participants included adults aged 18 to 60 years, of either sex, who had been diagnosed with liver cirrhosis (as per the operational definition in Table 1) for at least six months before the study. All included patients were experiencing upper GI bleeding and fell within Child-Pugh classes A, B, or C [13]. The diagnosis of liver cirrhosis was confirmed through clinical and laboratory data, based on established criteria. Whereas, in the exclusion criteria, patients were excluded if they presented with a source of bleeding in the upper or lower respiratory tract, indicated by symptoms such as cough, sputum production, or chest X-ray findings of consolidation, nodules, cavities, or masses. Additionally, patients unfit for endoscopy due to cardiac conditions, including recent myocardial infarction or heart failure classified as NYHA class 3 or 4, were excluded[14].Individuals taking beta blockers or nitrates, which could alter the risk of variceal bleeding and introduce bias, were also excluded[15]. Lastly, patients in circulatory failure, defined as a systolic blood pressure (BP) of less than 90 mmHg and diastolic BP of less than 60 mmHg, were not considered for the study[16]. Data were analyzed using SPSS 30.0.0. The descriptive statistics (e.g., mean, standard deviation, frequencies, and percentages) were used to summarize demographic and clinical characteristics. The primary outcome (mortality rate) was calculated with a 95% confidence interval. Associations between variables (e.g., Child-Pugh class and mortality) were assessed using chi-square tests for categorical data, and t-tests for continuous data, as appropriate. Multivariate logistic regression analysis was performed to identify independent predictors of mortality. A p-value of <0.05 was considered statistically significant.

Cochran's Sample Size Formula:

$n = Z^2 P(1-P) / E^2$ Eq.1

Where:

- **n** = Required sample size
- **Z** = Z-score (standard normal deviation, typically

1.96 for a **95% confidence level)**
• **P** = Expected proportion (mortality rate **4.4% = 0.044)**
• E = Margin of error (e.g., **2.2% = 0.022)**
Hence, n=202

RESULTS

The duration of hospital stay for the patients was 7 days on average. In-hospital mortality due to variceal causes was observed in 7 patients (4.4%). In Pakistan, doctors face emerging challenges in managing upper gastrointestinal bleeding due to the rising prevalence of liver cirrhosis, largely driven by chronic hepatitis infections[17]. The substantial portion of undiagnosed individuals suffering from cirrhosis complications exacerbates these challenges[18]. This study underscored that variceal bleeding is a leading factor of upper GI hemorrhage in patients with liver cirrhosis, with a high incidence of mortality among these patients. The findings emphasize the importance of accurate clinical presentation, timely treatment, and effective management strategies, including endoscopic intervention, to improve outcomes for liver cirrhosis patients with UGI bleeding.

Table 1: Patient Profiles and Baseline Characteristics

Total patients	202
Age, mean ± SD, years	54.92 (8.86)
Gender	
Male, number (%) Female, number (%)	128 (63.4%) 74 (36.6)
Presentation, number (%)	Hepatitis B 47 (23.26) Hepatitis C 82 (40.59) Hepatitis B & D 39 (19.3) Alcohol 21 (10.39) Cryptogenic 13 (6.43) Esophageal varices 140 (70) Gastric varices 19 (9.5) Peptic Ulcer 41 (20.29) Hematemesis 42 (20.79) Malena 68 (33.66) Both Hematemesis & Malena 90 (44.5)
Variceal and non-variceal Hemoglobin, mean ± SD, g/dl	12.58 (2.36)
Duration of hospital stay, days	7
Mortality in-hospital	Variceal Cause 7(4.4%)

Table 1: Provides the overall characteristics of the 202 patients under the observation of UGI disorder with different indicators, age, and sex. The mean age is between 51 to 72, their total mean stay is about 7 days, and the mortality rate of UGI bleeding varies by gender and age[19]. The elders are more vulnerable and have a higher chance of reactivation of the disease. However, the young and mainly the female have less chance of mortality and reappearance of the disease[20]. The main variables of the observation of all patients are cirrhosis, along with the esophageal varices, Melena, Hematemesis, and both causes in any patient, including peptic ulcer.

Table 2: Underlying Factors of Upper GI Hemorrhage

Variceal Causes	**Male Number of Cases** (%)	**Female Number of Cases** (%)	**Total (%)**	***P* -value**
Esophageal Varices	98 (48.5)	43 (21.5)	141 (69.8)	0.004
Gastric Varices	8 (3.5)	12 (6)	20 (9.9)	0.035
Peptic Ulcer Causes				
Gastric Ulcer	16 (8)	17 (6)	33 (16.5)	0.074
Duodenal Ulcer	6 (3)	2 (1)	8 (4)	0.732

Bold p-values <0.05 indicate the study has reached statistical significance.

Table 2: Mentions the key factors of Upper gastrointestinal hemorrhage by dividing them into gastric varices, esophageal varices, and peptic ulcer (gastric ulcer and duodenal ulcer). In this clinical survey, variceal bleeding in cirrhotic patients was one of the commonest causes of UGIB, and it was determined that varices were more common in males as compared to females. In our study total of 161 out of 202 patients were diagnosed with variceal bleeding. However, 70% of patients with variceal bleeding were diagnosed with esophageal varices; amongst them, 48.5% were males and 21.5% were females. Whereas, gastric varices were also found in some cases, herein out of 161 variceal bleeding cases, 20 patients experienced gastric varices, and amongst them male and female ratio was almost 1:2 (3% & 6%) respectively. Furthermore, some patients have been diagnosed with a peptic ulcer. Mainly, the peptic ulcer causes were gastric ulcers and duodenal ulcers, which were responsible for bleeding in UGI patients in-hospital, which can be traced down to other diseases like erosive gastritis and ulcers. Gastric ulcer causes 8% of male patients to bleed and 8.5% of females, whereas patients presented with duodenal ulcers are 1% and 4% for males and females. In terms of the prevalence of peptic ulcer, our studies showed different results as compared to Western studies. This could be due to the lower occurrence of chronic hepatitis C in Western regions.

Table 3: Key Variables in GI Bleeding Among Cirrhosis Patients

Parameters	Variceal Group (N=161) %	Non-Variceal Group (N=41) %	Total(N=202) %	*P* -value
Hematemesis	33 (16.33)	7 (3.46)	42 (20.79)	0.098
Melaena	58 (28.71)	13 (6.43)	69 (34.15)	0.026
Haematemesis and Melaena	70 (34.65)	21 (10.39)	91 (45.04)	0.171

Table 3. Depicted that out of 202 patients, the majority of patients presented with both hematemesis and melaena, amongst them 69 were from the variceal group and 21 were from the non-variceal group. In total, 91(approx 45%) patients presented with both hematemesis and melaena. Whereas, patients presented with only melaena were recorded as 69 (approx. 34%), amongst them 58 patients were included in the variceal group, and the rest 13 were diagnosed with the non-variceal group. Similarly, patients presented with hematemesis only were 42(21%), and amongst them, 32 and 7 patients were diagnosed from the variceal and non-variceal groups. The table provides a comparable presentation of UGI bleed in variceal and nonvariceal groups. The most common source of UGI bleed was ruptured esophageal varices in 140 (70%) patients. Non-variceal characteristics of UGI bleed accounted for 41 cases in the present study. The majority of non-variceal bleeds were due to peptic ulcer disease, and that accounted for 21.5 % of non-variceal and UGI bleed cases in liver cirrhosis. Out of non-variceal bleed cases, 8 patients had duodenal ulcers and 33 patients had gastric ulcers.

Table 4: Endoscopic findings: Frequency by Gender

Endoscopic Finding	Male%	Female%
Esophageal Varices	89%	11%
Gastritis	40%	25%
Duodenitis	2%	1%
Esophageal Cancer	37%	18%
Gastritis Ulcer	28%	12%
Duodenal Ulcer	4%	1%

Table 4 describes the root cause behind the Cirrhosis with UGB during the endoscopic findings, both in males and females. Compared to females, males are more targeted and vulnerable to this disease because of alcohol intake, as it is very rare in females[21].

Table 5: Frequency of Variceal Cases Across Child-Pugh Classes

Child-Pugh Class	Variceal Patients No Death (N=154)	Mortality (N=7)
A	1	0
B	109	0
C	44	7

Table 5. Data analysis provides the average result about the mortality rate, it has been measured within the categorization of groups A, B, and C. Child-Pugh class was calculated before endoscopy showed the result of 161 out of 202 patients were admitted to hospital with the upper gastrointestinal bleeding varices and categorized into three groups depending on their conditions and indicators. Those who fall under the A category are far away from any danger, have no mortality reports, and will survive with huge success. Patients belong to category B, and the majority of the patients fall under this group, where, after a certain time, the disease reappears but does not lead to fatality. In the third group, "Class C", patients have serious health conditions and their mortality rate was too high as compared to other CTP classes thus, this study confirms that 7 patients out of 44 died from Child-Pugh Class C.

DISCUSSION

When there is significant bleeding, immediate resuscitation is essential. Endoscopy is the gold standard for diagnosis, and it can also facilitate certain therapeutic approaches[22]. Radiological and surgical procedures are two more types of management. Mainly, hepatitis cirrhosis accounted for most of the total cases. 47 cases were diagnosed with chronic hepatitis B, 39 patients were diagnosed with co-infection hepatitis B and D. 82 cases were diagnosed with chronic hepatitis C, 13 were diagnosed with alcoholic cirrhosis, and the rest of the 21 patients were classified as cryptogenic. The majority of patients presented with Hematemesis and Melaena. Around 90 (45.9%) patients presented with both Hematemesis and Melaena, and 69 (34%) presented with only Melaena, and the remaining 42 (21 %) with Hematemesis only. Standard deviation (SD), interquartile range (IQR), and international normalized ratio (INR). The total of 202 patients has an overall mean hemoglobin is 10.8 in the variceal and 13.6 in the non-variceal group. Mortality was also higher in the variceal group compared to that of non-variceal patients, which was zero. In our study, the specific findings were to survey on the mortality rate in-hospital for those UGIB cirrhotic patients, and our findings also showed that the variceal group has higher bleeding episodes than the non-variceal group, as well as the death ratio, as shown in the above table. Herein, this study confirmed that the mortality rate increases with age and other comorbidities.

In most studies, the incidence of upper gastrointestinal bleeding ranges from 48 to 160 instances per 100,000 persons per year, with a death rate of 6-14 percent. The huge disparities in the aetiology of upper gastrointestinal bleeding in Pakistan, as well as a lack of suitable facilities, make it necessary to identify the most common cause of upper gastrointestinal hemorrhage. The underlying factors and intensity of GL bleeding vary based on age, gender, and intake of liquor. For that purpose, I have analyzed and observed in my sampling and study cirrhosis, peptic ulcer, esophagitis, cancer, dieulafoy's lesion, haemobilia, GAVE (gastric antral vascular ectasia), and HHT (hereditary hemorrhagic telangiectasia disease). The main reason behind the increasing mortality rate of upper gastrointestinal bleeding is because to Cirrhosis often termed as Varices[23]. Whereas, a significant number of such patients also present with non-variceal bleeding (NVB), with a mortality rate. At the global level, the highest mortality and morbidity can be seen in the United Kingdom, and on the second scale, it can be observed in the United States of America. In Pakistan, the mortality rate varies depending on the causes of the upper gastrointestinal bleed with cirrhosis. According to this study, there is almost 4.4% variceal mortality in hospitals.[24] During this descriptive study, the main characteristics of the 202 patients were. The common characteristics, such as age, gender, prior disorder, and current health, have all been examined with consent. The main variables of UGI bleeding in liver cirrhosis are Hematemesis, melena, and some other esophageal and gastric varices[25].

CONCLUSION

This study, involving 202 patients, highlights the significant burden of upper gastrointestinal bleeding (UGIB) in liver cirrhosis patients, with variceal bleeding being the predominant cause, accounting for 79.5% of cases, including esophageal and gastric varices. Non-variceal bleeding, particularly from peptic ulcers, was observed in 20.5% of cases.

Variceal bleeders exhibited a higher risk of rebleeding and mortality compared to non-variceal bleeders, with an in-hospital mortality rate of 4.4%. The findings underscore the critical role of timely clinical assessment, endoscopic intervention, and tailored management strategies in improving outcomes for cirrhotic patients with UGIB. The study also reveals the importance of addressing underlying factors such as chronic hepatitis infections, which contribute to the rising prevalence of liver cirrhosis in Pakistan. The lack of extensive local data on UGIB in cirrhotic patients further emphasizes the need for larger, multicenter studies to develop region-specific guidelines. Early diagnosis, effective treatment protocols, and patient education are essential to reduce morbidity and mortality associated with UGIB in this high-risk population.

LIST OF ABBREVIATIONS

UGIB-Upper Upper gastrointestinal Bleeding
VUGIB- Varices Upper Gastrointestinal Bleeding
NVUGIB- Non-Varices Upper Gastrointestinal Bleeding

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CONFLICT OF INTEREST

There is no conflict of interest.

PATIENT CONSENT

The consent was obtained from the patients involved in this research study.

ETHICAL APPROVAL

The study received ethical approval from the Institutional Review Board at the Department of Medicine, Peoples Medical College Hospital, Nawabshah. It was conducted in the Department of Medicine over six months after the synopsis was approved.

AUTHORS' CONTRIBUTIONS

MD, AAS, WRM, ZP, MZ, and RHK were collectively involved in conceptualizing the study, designing the methodology, and supervising data collection.**MD: AAS** was key in drafting the manuscript and conducting the literature review. **WRM and MZ** were responsible for data analysis, interpretation, and statistical validation using **SPSS**. **ZP and RHK** supervised the clinical survey, ensuring proper patient evaluation, endoscopic assessments, and documentation of pre- and post-endoscopic findings.

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