

Magnitude of Diabetes Mellitus in Upper Gastrointestinal Hemorrhage

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ABSTRACT

Objective: To determine the frequency of diabetes mellitus in patients presenting with upper gastrointestinal hemorrhage.

Methodology: This descriptive cross-sectional study was conducted at Department of Gastroenterology, Isra University Hospital, Hyderabad, from February, 2020 to August, 2020. All individuals aged 18 to 60 years, of both genders, and those experiencing upper gastrointestinal bleeding were enrolled. A 5ml blood sample was taken to evaluate the blood sugar level. DM was defined as fasting plasma glucose > 7 mmol/l (126 mg/dl), or 2 hours post prandial plasma glucose >11 mmol/l (200mg/dl). All the collected information was entered into the predesigned proforma. Data was analyzed using SPSS v. 23.0.

Results: The mean age was 42.1 ± 11.2 years, and the mean body mass index (BMI) was 26.4 ± 6.1 kg/m². Among 184 patients, 73 (39.7%) were male, and 111 (60.3%) were female. Diabetes mellitus was found in 21 (11.4%) patients. Stratification of age groups, gender, BMI, and socioeconomic status with DM among individuals with upper gastrointestinal hemorrhage found to be statistically insignificant ($p > 0.05$).

Conclusion: Upon investigation of the prevalence of Diabetes Mellitus in cases of Upper Gastrointestinal Hemorrhage, notable results were found, revealing an observed incidence of DM at 11.4%. This emphasizes a significant presence of DM within this cohort, so prompt additional investigation into the connection between DM and Upper Gastrointestinal Hemorrhage are recommended.

Keywords: Diabetes Mellitus, UGI Hemorrhage, Hospital readmission, Care fragmentation.

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Introduction

Gastrointestinal (GI) bleeding is a medical condition that leads to roughly 7000 admissions to emergency departments each year.^{1,2} In certain patients, acute GI bleeding can pose a life-threatening situation, with reported mortality rates ranging from 7% to 8.2% among those admitted with this condition.^{1,2} Efficient management necessitates the utilization of a risk-stratification tool to classify patients into the high risk and the low risk groups, facilitating treatment and subsequent monitoring.^{3,4} Various studies have identified numerous risk factors associated with mortality.⁴ Endoscopy stands

as the primary diagnostic and therapeutic method for addressing upper gastrointestinal bleeding (UGIB).⁵ Peptic ulcer disease represents the leading cause of non-variceal UGIB, constituting 50% to 70% of cases.⁵

Endoscopic assessment is crucial for both diagnosing and treating upper GI bleeding (UGIB).⁶ Present guidelines advise conducting endoscopy within 24 hours of patient admission, with a focus on stabilizing their hemodynamics before the procedure.⁶ Identifying the clinical factors that can help pinpoint patients with gastrointestinal bleeding at a high risk of poor outcomes could enhance initial triage,

as well as inform decisions regarding the timing of primary endoscopic hemostasis and therapeutic management.^{1,7}

Elevated mortality rates, recurrent bleeding episodes, and the necessity for endoscopic hemostasis or surgical intervention are linked to risk factors such as being over the age of 60 and having comorbidities.⁸

An analysis revealed that the presence of comorbidities such as DM or metastatic malignancy, as well as hypotension during hospitalization, are significant predictors of short-term mortality.⁹ Particularly in diabetic patients, diabetic angiopathy compromises mucosal integrity, resulting in more severe ulcers, and DM heightens susceptibility to acute gastrointestinal injury while impacting mucosal healing.^{9,10} According a previous study the diabetes mellitus was linked to increased rates of rebleeding, prolonged hospitalization, and increased mortality rates during hospitalization within a 90-day period among patients of cirrhosis experiencing acute bleeding from esophageal varices.¹¹ Moreover, numerous underlying medical conditions, medications, and unhealthy habits such as smoking have been established as risk factors for UGIB. Although gastrointestinal bleeding may also be associated with diabetic ketoacidosis (DKA) and is a common reason for seeking inpatient gastroenterology evaluation, it can present either overtly or occultly.¹² Uncontrolled diabetes mellitus can lead to gastrointestinal symptoms, possibly through gastric autonomic neuropathy.¹³ Additionally, it's suggested that uncontrolled diabetes affects the function of interstitial cells of Cajal, which regulate gut motility as pacemaker cells.¹³ While there have been limited reports of GI bleeding in diabetic ketoacidosis (DKA), there remains a scarcity of studies investigating this phenomenon.^{13,14}

The rationale for this research article arises from the persistent global challenge presented by upper gastrointestinal (GI) bleeding, which continues to be a leading cause of mortality despite advancements in management techniques. This study aims to assess the prevalence of diabetes mellitus within this context. Remarkably, an extensive literature search has uncovered a scarcity of prior data, both nationally and internationally, specifically focusing on diabetic patients. Given the absence of such data in Pakistan, it has become imperative to address this knowledge gap to facilitate early detection and optimize treatment, thereby alleviating the burden of the disease. Additionally, by leveraging the findings of this study, we can develop targeted strategies for the optimal management of this patient population.

Methodology

This Descriptive Cross-Sectional Study was done at Department of Gastroenterology, Isra University Hospital, Hyderabad. Study was done during six months from February 2020 to August 2020. By using WHO sample size calculator using frequency of diabetes mellitus (8.33%) in patients with upper gastrointestinal hemorrhage.¹⁶ Margin of error (d)=4%, Confidence level (C.I) = 95% then the estimated sample size was n=184.

Non-Probability, Consecutive Sampling technique was used Patients with age group 18 to 60 years, either gender, patients with upper gastro-intestinal bleeding (defined as Hematemesis (bright red and/or coffee colored material in vomitus) and melena (black tarry, sticky stool), were included. Patients on anticoagulants, patients with history of bleeding diathesis like DIC, Leukemia, thrombocytopenia and history of advanced cardiorespiratory disease, CVA, renal disease, advanced malignancies, patients with lower tract gastro-intestinal bleeding and patients with hypertension and those who did not give consent were excluded. After taking written informed consent from each patient or their attendant a 5ml blood sample was taken to evaluate the blood sugar level.

Diabetes mellitus was defined as fasting plasma glucose > 7 mmol/l (126 mg/dl), or 2 hours post prandial plasma glucose >11 mmol/l (200mg/dl). The privacy and confidentiality of patients were safeguarded by assigning codes to the dataset instead of using names, and by ensuring that the data remained password-protected. All the collected information was entered into the predesigned proforma. Data was analyzed using SPSS v. 23.0. Mean and was calculated for age, weight, Height and BMI. Frequency and percentage were calculated for categorical variables. Data was stratified for effect modifiers/confounders like age, gender, BMI, and socioeconomic status. Post stratification, Chi square test was applied using two-sided $P \leq 0.05$ as significant.

Results

According to the descriptive statistics detailing the demographic characteristics of a sample size of 184 individuals. The mean age of the patients was 42.1 years and a standard deviation of 11.2 years, and mean BMI was 26.4 ± 4.1 kg/m². Additionally, it outlines the distribution of gender, with 73 males (39.7%) and 111 females (60.3%). Furthermore, socioeconomic status is depicted, showing that 57 individuals (30.9%) belong to the lower

class, 48 (26.2%) to the middle class, and 79 (42.9%) to the upper class. (Table I)

Table I: Descriptive statistics of demographic characteristics. (n=184)		
Variables		Statistics
Age (Mean±SD)		42.1±11.2 Years
BMI (Mean±SD)		26.4± 4.1 kg/m ²
Gender	Males	73 (39.7%)
	Females	111 (60.3%)
Socioeconomic status	Poor	57 (30.9%)
	Middle	48 (26.2%)
	Rich	79 (42.9%)

In this study incidence of the diabetes mellitus was found in 11.40% of the cases among patients with upper gastrointestinal haemorrhage. Figure 1

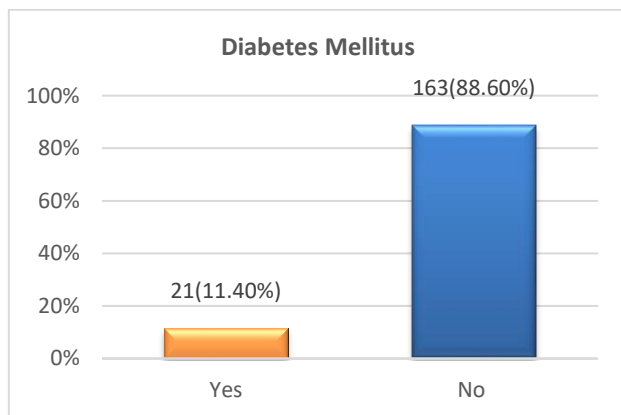


Figure 1. Incidence of the diabetes mellitus.

The occurrence of DM among individuals having Upper GI Hemorrhage was examined across various demographic factors such as age, gender, and Body Mass Index (BMI). However, the analysis revealed that these factors did not show a statistically significant association with the presence of DM, as indicated by p-values exceeding 0.05. (Table II)

Table II: Incidence of DM in UGI Haemorrhage with respect to the age, gender and BMI. (n=184)

Variables		Diabetes Mellitus		P-value
		Diabetic	Non-Diabetic	
Age groups	18 – 30	7(3.8%)	32(17.4%)	0.148
	> 30	14(7.6%)	131(71.2%)	
Gender	Male	9(4.9%)	64(34.8%)	0.751
	Female	12(6.5%)	99(53.8%)	
BMI	18 – 24 kg/m ²	11(6.0%)	92(50.0%)	0.724
	> 24 kg/m ²	10(5.4%)	71(38.6%)	

Discussion

Upper gastrointestinal (UGI) bleeding stands as a significant contributor to mortality worldwide, despite advancements in medical care. Among the numerous

factors influencing prognosis in UGI bleeding, the presence of diabetes mellitus (DM) emerges as a notable poor prognostic factor. Our study aimed to assess the prevalence of diabetes mellitus among patients presenting with upper gastrointestinal (UGI) hemorrhage. The study cohort comprised 184 patients with an average age of 47.23 ± 7.2 years, including 73 males (39.7%) and 111 females (60.3%). Consistent with our findings, Surendran et al.¹⁵ reported a slightly higher mean age of 53.5 ± 13.17 years among patients with upper GI bleeding, with a female-to-male ratio of 5:1.3. Similarly, Badipatla et al.¹³ found that the average age of patients with acute GI bleeding was 52 years, with males accounting for 48% and females for 52% of the cases. Another study by Mohammad et al.¹⁶ reported a lower average age of 41.03 ± 14.94 years, with a distribution of 49.3% males and 50.7% females. The predominance of females in most studies, including ours, suggests a consistent trend. This gender distribution may be attributed to various factors, but further investigation is warranted to elucidate underlying causes.

In this study, the incidence of diabetes mellitus among patients with UGI hemorrhage was determined to be 11.40%. However, when categorizing the incidence of DM among patients with UGI Hemorrhage by age, gender, and Body Mass Index (BMI), statistical analysis revealed insignificance, with p-values exceeding 0.05. To the best of our knowledge, no specific studies addressing a similar objective were found in the literature. To the best of our knowledge, we did not find any specific studies addressing a similar objective in the literature. However, several studies have reported the prevalence of diabetes as a comorbidity alongside other conditions. For instance, Kim et al,¹⁷ observed a significantly raised risk of UGIB in elderly patients with diabetes treated with NSAIDs. Additionally, Siebenhüner et al,¹⁸ found the frequency of diabetes mellitus to be 19.2% among patients with UGIB and 22.9% among those with lower GI bleeding. Furthermore, their study revealed clinically significant trends toward 30-day readmissions in patients with hypertension, diabetes, and several other comorbidities.¹⁸

In a study by Kiattiweerasak A et al,¹⁹ diabetes mellitus was reported as a common comorbidity in 16.7% of patients with upper gastrointestinal bleeding. Similarly, Almadi et al,²⁰ conducted a study to assess the causes and consequences of UGIB that 43.7% of patients had diabetes mellitus. Comparatively, Qayed E et al,²¹ investigated various causes and outcomes of UPGI among hospitalized patients, with diabetes present in 45.6% of cases. Both of

these studies reported a higher prevalence of diabetes compared to our study, potentially due to the higher mean age of participants, suggesting that older individuals were more predominant in their studies. However, no specific study focusing on this cohort was found in the literature. Our study has several limitations, including a limited sample size and a lack of analysis on the association of diabetes mellitus with prognosis, including rebleeding among patients. Further large-scale studies are recommended to confirm our findings and evaluate the impact of DM as a prognostic factor in patients with UPGI, considering both short-term and long-term outcomes.

Conclusion

Upon analyzing the prevalence of Diabetes Mellitus in cases of Upper Gastrointestinal Hemorrhage, significant findings emerged, with DM observed in 11.4% of cases. This highlights a notable presence of DM within this cohort, suggesting a potential association between DM and Upper Gastrointestinal Hemorrhage. Therefore, further investigation into this relationship is warranted to better understand the underlying mechanisms and implications for patient management. Additional research in this area could contribute to improved clinical strategies and outcomes for individuals with both DM and upper gastrointestinal hemorrhage.

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