https://doi.org/10.29309/TPMJ/2025.32.01.8384

The Professional Medical Journal
www.theprofesional.com
2025, Volume, 32 Issue, 01

ORIGINAL ARTICLE

The 30 days readmission among patients with upper GI bleeding and its causative factors: An experience of tertiary care hospital in Karachi.

Narjis Raza[1], Mansoor ul Haq[2], Adeel Rahat[3]

Article Citation: Raza N, Mansoor ul Haq, Rahat A. The 30 days readmission among patients with upper GI bleeding and its causative factors: An experience of tertiary care hospital in Karachi. Professional Med J 2025; 32(01):23-29. https://doi.org/10.29309/TPMJ/2025.32.01.8384

ABSTRACT… Objective: To determine frequency and factors causing 30 days readmission rate among patients of upper gastrointestinal bleeding (UGIB) at a tertiary care hospital. **Study Design:** Prospective Cohort study. **Setting:** Department of Gastroenterology, Liaquat National Hospital, Karachi, Pakistan. **Period:** July 2023 to June 2024. **Methods:** A total of 192 patients of either gender, aged 18 years or above, and admitted in hospital with UGIB were analyzed. Patients demographic, clinical and laboratory data were gathered. The final study outcome variable was 30 days all cause readmission. Data was entered in SPSS version 26 to perform statistical analysis. **Results:** Total 192 patients were studied mean age of 54.9 ± 13.2 years. Most of patients were males (80%). Presenting symptoms included melena (39.4%), hematemesis (47.4%) and drowsiness (5.7%), vomiting (4.2%), fever (2.1%) and SOB (2.1%). Readmission rate was 20.8%. Causes of readmission are rebleeding (80%), infection (2.6%) and electrolyte imbalance (1.6%). Increasing sodium levels were also associated with lower readmission risk. Increasing INR was associated with increasing readmission risk. **Conclusion:** This study concludes that 30 days readmission rate among UGIB patients is noticeably high. Rebleeding, infections, and electrolyte imbalance were the most common factors behind readmission among UGIB patients.

Key words: Fever, Gastrointestinal Bleeding, Readmission, Upper Gastrointestinal Bleeding, Vomiting.

INTRRODUCTION

The upper gastrointestinal bleeding (UGIB) is a common gastroenterological emergency that accounts for 50 to160 per 100,000 individuals per year and 6-10 % mortality per year. It requires in-hospital care including medical and endoscopic ,radiological and rarely surgical management.[1,2] The upper GI bleeding is defined as blood loss above the ampula of vater within reach of upper endoscopy or blood loss from anywhere between esophagus and ligament of treitz.[3]

The upper GI bleeding is divided in two main categories i-e variceal and non variceal bleeding. The variceal bleeding is a serious complication of liver cirrhosis with portal hypertension.[4] The esophageal varices estimated to present in one half of patients with cirrhosis at the time of diagnosis and accounts for approximately two third of all bleeding episodes in variceal patients.[5]

The non-variceal bleeding including gastric / duodenal ulcer, gatroduodenal erosions, erosive esophagitis, Mallory Weiss tears and some other conditions, accounts for 80-90% of UGIB cases.[6]

The Gastrointestinal bleeding have wide variety of presentation with different sign and symptoms and severity.[7] The most common presentation in hematemesis and melena The severity of UGIB is defined by hemodynamic status and need of red pack cell for transfusion.[8] The effective management of UGIB requires use of risk stratification tool to identify low risk and high risk groups which can be used to guide treatment and follow-up .Various scores system has been used for risk assessment combine with clinical and endoscopic parameters ,most commonly used assessment scores are Blatchford score and rockall score.[9]

1. MBBS, Post-graduate Resident Gastroenterology, Liaquat National Hospital, Karachi, Pakistan.
2. MBBS, FCPS (Medicine), FCPS (Gastroenterology), Consultant Gastroenterologist and Hepatology, Liaquat National Hospital, Karachi, Pakistan.
3. MBBS, FCPS (Gastroenterologist), Senior Registrar Gastroenterology, Liaquat National Hospital, Karachi, Pakistan

Correspondence Address:
Dr. Narjis Raza
Department of Gastroenterology
Liaquat National Hospital, Karachi, Pakistan.
narjisraza@gmail.com

Article received on: 11/08/2024
Accepted for publication: 29/10/2024

During hospital stay UGIB requires intensive medical investigation and treatments including laboratory test, transfusion and diagnostic and therapeutic strategies to identify and control bleeding such as endoscopy, radiological embolization and sometime surgeries.[10] Despite of advances in the diagnosis and management of UGIB, the mortality rate has not changed significantly in last 50 years.[11]

The hospital readmission is common in patient with upper GI bleeding, 30 day readmission occurs in 7-25% of discharge, it puts financial burden on patients, their families and health care system. It is also indicator of poor health system.[1] Various factors are responsible for readmission including rebleeding, infection, volume overload and other complication of cirrhosis. The likelihood of unplanned readmissions is the highest in the immediate post-discharge period.[12] The readmission rate ultimately affects hospital performance and quality. Since reduction in readmission rates might simultaneously lower the associated costs and improve the quality of care, public and private payers have progressively targeted readmissions as a focus of pay-for-performance initiatives. In accordance with this scenario and hospital driven efforts for improved patient care, this study aimed to determine frequency and factors causing 30 days readmission rate among patients of UGIB in a tertiary care hospital.

METHODS

This prospective follow-up study was performed in Gastroenterology Department at Liaquat National Hospital, Karachi. Pakistan. The study was carried out during 1 year (from July 2023 to June 2024) with the Ethical Review Committee approval (letter number: App No.0821-2022 LNH-ERC, dated: September 19, 2022). Patients of either gender, age 18 years or above, and admitted in hospital with UGIB were analyzed. Pregnant females, patients with lower GIB and not giving consent for study participation were excluded. A sample size of 192 was calculated taking p=14.6%[4] at 95% confidence interval and 5% precision. Sample size was calculated on online calculator Open-Epi. Non-probability consecutive sampling technique was used to enroll patients.

Chronic liver disease was defined by clinical criteria of stigmata of chronic liver disease with evidence of small liver on ultrasound (REF). Patients' data including age, gender, residence, disease etiology, Child Pugh classification, biomarkers including hemoglobin (Hb), white blood cells (WBC), platelet count, bilirubin, alanine aminotransferase (ALT), aspartate aminotransferase (AST), albumin, INR, BUN, creatinine, sodium and potassium were recorded. The final study outcome variable was 30 days all cause readmission.

Data was entered in SPSS version 26 to perform statistical analysis. Categorical variables were expressed as frequency and percentage. Numerical variables were expressed as mean ± standard deviation. Logistic regression was applied and odds ratio with 95% confidence interval was calculated to assess factors associated readmission. P-value less than or equal to 0.05 was taken as statistically significant.

RESULTS

Mean age of patients 54.9 ± 13.2 years with age range of 28-83 years. Most of patients were males (80%) and belonging to urban areas (53.6%). Presenting symptoms included melena (39.4%), hematemesis (47.4%) and drowsiness (5.7%), vomiting (4.2%), fever (2.1%) and SOB (2.1%).

Readmission rate was 20.8%. Causes of readmission are rebleeding (80%), infection (2.6%), and electrolyte imbalance (1.6%). Increasing sodium levels were also associated with lower readmission risk (p=0.047). Increasing INR was associated with increasing readmission risk (p=0.011). Details about the association of various demographics, disease etiology, and laboratory parameters with respect to readmission are shown in Table-II, Table-III and Table-IV.

DISCUSSION

Nearly one-fifth of patients admitted with upper GI bleeding face rehospitalization within 30 days.[13]

Variables	Frequency
Age groups	
≤30 years	12(6.3)
31-49 years	9(4.7)
50-59 years	90(46.9)
60 years and above	81(42.2)
Gender	
Male	154(80.2)
Female	38(19.8)
Residence	
Rural	89(46.4)
Urban	103(53.6)
Disease etiology	
Variceal bleed	93(48.4%)
Esophageal varices	45(23.4)
Gastric varices	23(12)
Gastroesophageal varices	25(13)
Nonvariceal bleed	99(51.6%)
Esophageal ulcer	32(16.7)
Gastric ulcer	38(19.8)
Duodenal ulcer	16(8.3)
Tumor bleed	13(6.8%)
Child Pugh classification	
Childs A	82(42.7)
Childs B	83(43.2)
Childs C	27(14.1)

Table-I. Summary of patients' demographic and clinical features

This alarming statistic prompts the need of conducting studies in our region to assess the risk of readmission, as increased rates of rehospitalization impose a significant burden on both family finances and healthcare system resources.[14]

Our study results demonstrated a readmission rate of 20.8% among patients with upper GI bleeding. These findings were analogous to studies conducted in various regions, indicating readmission rates around 20%.[15,16] In a recent systematic review, nearly 40 abstracts, reported an almost consistent readmission rate of 17.4%.[13] These collective findings signifies the prevalence of readmission as a common occurrence in patients following upper GI bleeding.

In the present study, the leading cause of readmission in upper GI bleed patients was rebleeding, affecting 80% of the patients, followed by infection and electrolyte imbalance.

Etiology	Groups	Readmission		OR (95% CI)	P-Value
		Yes n(%)	No n(%)		
	Urban	21(20.4)	82(79.6)	Reference category	
Esophageal varices	Yes	9(20)	36(80)	0.94 (0.41-2.14)	0.875
	No	31(21.1)	116(78.9)	Reference category	
Gastric varices	Yes	4(17.4)	19(82.6)	0.77 (0.24-2.43)	0.666
	No	36(21.3)	133(78.7)	Reference category	
Gastroesophageal varices	Yes	3(12.5)	21(87.5)	0.51 (0.14-1.78)	0.290
	No	37(22)	131(78)	Reference category	
Esophageal ulcer	Yes	6(18.8)	26(81.3)	0.85 (0.32-2.24)	0.751
	No	34(21.3)	126(78.8)	Reference category	
Gastric ulcer	Yes	9(23.7)	29(76.3)	1.23 (0.53-2.86)	0.629
	No	31(20.1)	123(79.9)	Reference category	
Duodenal ulcer	Yes	1(6.3)	15(93.8)	0.23 (0.03-1.82)	0.166
	No	39(22.2)	137(77.8)	Reference category	
Tumor bleed	Yes	1(7.7)	12(92.3)	0.29 (0.04-2.37)	0.253
	No	39(21.8)	140(78.2)	Reference category	
Melena	Yes	13(17.1)	63(82.9)	0.68 (0.33-1.42)	0.305
	No	27(23.3)	89(76.7)	Reference category	
Hematemesis	Yes	19(20.9)	72(79.1)	1.01 (0.50-2.01)	0.988
	No	21(20.8)	80(79.2)	Reference category	
Drowsiness	yes	1(9.1)	10(90.9)	0.36 (0.04-2.93)	0.342
	no	39(21.5)	142(78.5)	Reference category	
Child pugh classification	a	18(22)	64(78)	0.66 (0.25-1.7)	0.419
	b	14(16.9)	69(83.1)	0.48 (0.17-1.32)	0.155
	c	8(29.6)	19(70.4)	Reference category	

Table-III. Association of disease etiology with readmission

Variables	Groups	Readmission		OR (95% CI)	P-Value
		Yes n(%)	No n(%)		
	b	14(16.9)	69(83.1)	0.48 (0.17-1.32)	0.155
	c	8(29.6)	19(70.4)	Reference category	
Hemoglobin (g/dl)	-	9.3(8.2-9.6)	9.2(8.5-9.6)	0.99 (0.77-1.27)	0.941
White blood cell count (million cells/mcL)	-	3.5(3.425-8.45)	4.5(3.5-8.3)	0.95 (0.85-1.05)	0.348
Platelet count (10^9/L)	-	165(106-225)	165(105-212)	1 (0.99-1.01)	0.891
Bilirubin (mg/dl)	-	0.8(0.5-1)	0.8(0.5-0.8)	0.68 (0.31-1.47)	0.331
Aspartate Transaminase (U/L)	-	30(28-32)	30(24-32)	0.99 (0.96-1.01)	0.594
Alanine Transaminase (U/L)	-	35(25.75-40)	32(28-40)	0.99 (0.96-1.02)	0.537
Albumin (g/dl)	-	3.45(3.2-3.6)	3.5(3.1-3.6)	0.64 (0.33-1.22)	0.179
International Normalized Ratio	-	1.2(1.2-1.4)	1.2(1.2-1.2)	6.27(1.23-8.94)	0.011
Blood Urea Nintrogen (mg/dl)	-	30(30-30)	30(20.25-40)	0.98 (0.96-1.01)	0.244
Creatinine (mg/dl)	-	0.8(0.35-1.1)	0.8(0.625-1.2)	0.52 (0.23-1.14)	0.105
Sodium (mEq/L)	-	135.5(135-140.75)	138(135-145)	0.94 (0.88-1.01)	0.047
Potassium (mEq/L)	-	3.5(3.5-4.2)	3.5(3.5-4.2)	1.14 (0.66-1.98)	0.627

Table-IV. Association of laboratory parameters with readmission
#: Numerical variables presented as median with inter-quartile range

A nationwide study conducted in 22 states in the US similarly reported rebleeding in the form of hemorrhage from the GI tract or bleeding from gastric or duodenal ulcers as the main reason for readmission. A small percentage of patients reported readmission due to sepsis-related infections.[17] Despite our study having a smaller sample size, the results from this multicenter study reinforce our findings. Cody L. Dunne, in his study, also reported that one-third of readmissions in upper GI bleed patients were attributed to rebleeding, either from GI causes, and a significant portion of readmissions were due to fluid and electrolyte disorders, as seen in our study too.[13] In contrast, some studies have also taken into account underlying conditions as potential reasons for readmission, such as metastatic disease, hypertension, renal failure, diabetes mellitus, chronic pulmonary disease, and CHF.[18] However, these associations were not evaluated in our study.

The mean age of patients in our study was 54.9 years, with a majority being males. Other studies have also reported male dominance in readmission rates. However, these studies reported a mean age above 60 years (66.6 years and 65.9 years, respectively).[13,17] The difference in mean age could be explained by the variance in the population size of our study compared to these researchers who took into account thousands of participants; hence, the age parameters are different. Our study also highlights the difference in readmission rates according to the place of residence, with higher incidences reported from urban residences than rural ones. However, this does not corroborate with previous study that documented higher readmission rates in rural patients.[19] These discrepancies suggest that urban people have greater access to medical services and funding for rehospitalization in our region compared to rural areas.

Patients readmitted for upper gastrointestinal bleeding often presented with symptoms such as hematemesis in nearly 50%, followed by melena, consistent with findings in the literature by Catiele Antunes and Bhattarai S which indicates these as common UGIB patient presentations.[20,21] A smaller proportion of our patients exhibited symptoms like drowsiness, vomiting, fever, and shortness of breath. However, our study did not reveal any association between these symptoms and readmission rates. On the contrary, another article suggests that one of the main presentation in rehospitalization of UGIB patients is shortness of breath due to fluid overload, alongside other symptoms.[16]

Patients with different etiologies were readmitted,

including variceal and non-variceal bleed. Among variceal bleed, etiologies were esophageal varices, Gastric varices and Gastroesophageal varices. Non-variceal bleed etiologies included esophageal ulcer, Gastric ulcer, Duodenal ulcer and Tumor bleed. Nevertheless, our study did not establish any significant relationship between these etiologies and readmission rates ($p > 0.01$). It is commonly observed that UGIB patients often present with similar etiologies, as mentioned in previous literature.[20] Moreover, Dunne CL and colleagues reported that peptic ulcer was the least common etiology of readmission in UGIB patients whereas our study documented erosive gastric disease as least common etiology of readmission.[13] The variation in the etiology of readmission in our study compared to other literature may be attributed to the potential impairment of different organ systems in diverse patient populations.[18]

The Child-Pugh scoring system is commonly used in patients with cirrhosis experiencing upper gastrointestinal bleeding (UGIB) to predict the prognosis of the patient, severity of the disease and the risk of variceal bleeding.[22,23] This scoring system is also considered superior to MELD scores in predicting hospital readmissions for patients with UGIB.[22] The current study results did not reveal any statistically significant association between Child-Pugh scores and the readmission of UGIB patients, aligning with results documented in another Asian cohort study.[24]

Patients with liver cirrhosis frequently encounter upper gastrointestinal bleeding,[25] and any changes in their lab parameters can help predict readmission rates and mortality. Notably, hyponatremia is identified as an independent predictor of mortality in advanced CLD patients, regardless of the MELD score. A study counted in India, found a significant association between INR and sodium levels with rehospitalization. Specifically, a serum sodium level below 133 mEq/L best predicted early readmissions, with a sensitivity of 52.6% and specificity of 65.8%.[24] Similarly, our results also demonstrate a significant relationship between these parameters as increasing INR is associated with a higher readmission risk, while rising sodium levels are linked to a lower readmission risk. Some literature also mentions that readmission rates are associated with a low hemoglobin count and abnormal coagulation profiles (thrombocytopenia); however, it does not predict any link with changes in INR or sodium levels.[21] These insights underscore the importance of observing hyponatremia and INR values as valuable indicators in predicting and managing readmissions among patients with UGIB.

The study does have a few limitations. First, the comorbid conditions of the patient including diabetes mellitus, hypertension, chronic kidney disease (CKD), and metastatic conditions were not taken into account while conducting this study. Additionally, we did not ask the medications history from patients such as antiplatelet/ anticoagulation agents, which might have played a role in causing rebleeding or contributing to the cause of readmission. Furthermore, our data did not distinguish between planned readmissions and unplanned readmissions.

CONCLUSION

This study concludes that 30 days readmission rate among UGIB patients is noticeably high. Rebleeding, infections, and electrolyte imbalance were the most common factors behind readmission among UGIB patients.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

SOURCE OF FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Narjis Raza	Conceptualized the study, Involved in data collection, Initial manuscript writing.	
2	Mansoor ul Haq	Designed the study protocol, Critically revised the initial manuscript draft.	
3	Adeel Rahat	Data collection, Literature review, Data analysis.	