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Frequency of Gastric Varices in Cirrhotic Patients with Portal Hypertension Based on Endoscopic Findings

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ABSTRACT

Background: Portal hypertension tends to complicate liver cirrhosis leading to development of varices. Although gastric varices are not very common as compared to esophageal varices, they are associated with severe bleeding and higher mortality. **Purpose:** The purpose of the endoscopic study was to determine the incidence of stomach varices in patients with portal hypertension who have cirrhosis. **Procedures:** This descriptive cross-sectional study was conducted by the Department of Medicine, Bolan Medical College/Hospital in Quetta from 15th January 2025 to 14th April 2025. Non-probability consecutive sampling was used to sample 120 cirrhosis patients who had portal hypertension between the ages of 18 and 60. Major comorbidities, patients who had undergone shunt operations, and those who had undergone variceal treatment were not included. A skilled consultant adopted upper gastrointestinal endoscopy to identify gastric varices. The data was analyzed using SPSS version 25.0. In an attempt to assess the effect modifiers, stratification was done and the frequency and percentages were calculated. The chi-square test was applied and p-value of less than 0.05 considered to be statistically significant. **Results:** 60.0% of the respondents were males and the mean age among them was 45.2 ± 10.6 years. There were twenty-four (20.0%) with gastric varices. Gastric varices and Child-Pugh class were found to be quite correlated (p = 0.03), and the rate increased with the Class A (10.0%), then Class C (32.5%). There was no significant correlation between age, gender, BMI, period of having cirrhosis, and residence (p > 0.05). **Conclusion:** Finally, gastric varices elongate very often in patients with cirrhosis, and they are closely associated with the development of advanced liver disease. Routine endoscopic screening is recommended in order to detect and treat the disease at an early stage.

INTRODUCTION

Liver cirrhosis being the end phase of chronic liver disease is a severe global health problem largely exacerbated by the development of portal hypertension. The presence of portosystemic collateral routes mainly esophageal and gastric varices is due to the presence of an increased portal pressure due to an increase in portal vascular resistance and portal venous influx.[1,2] These varices are of clinical significance because their rupture is one of the leading causes of morbidity and mortality in the patients of cirrhosis.[3]

Gastric varices (GV) are enlarged submucosal veins in the stomach caused by portal hypertension (approximately 1030 percent of patients with liver cirrhosis).[4,5] Gastric varices are not as frequent as esophageal ones, and their rupture is associated with more drastic episodes of bleeding and increased mortality rates.[5,6] Recent studies further reveal that approximately half of the patients who have cirrhosis develop gastroesophageal varices at one point in their disease, and some of them develop into high-risk lesions that are likely to bleed.[7] It has also been reported that the incidence of stomach varices among the populations with cirrhosis is between 15 and 25 percent and these vary depending on the severity of the condition and the mode of diagnosis.[5,8]

The pathophysiology of gastric varices is linked to complex hemodynamic changes, including an increase in the pressure of the short gastric and splenic venous systems. Such alterations lead to the formation of the collateral pathways in the gastric fundus and the cardia.[1,9] These varices can be anatomically and clinically implications, as well as form independent lesions or in continuum with the esophageal varices. The Sarin classification, which is also dependent on endoscopic

localization, remains to be the most popular type of classification of gastric varices into gastroesophageal (GOV1, GOV2) and isolated gastric varices (IGV1, IGV2).[9]

In gastric varices, upper gastrointestinal endoscopy remains the gold standard in the identification, categorization, and risk assessment. It is important in the treatment of portal hypertension to allow direct visualization and therapeutic procedures. Despite the use of improved imaging techniques, such as computed tomography, endoscopy remains important in clinical practice to evaluate the burden of varices.[10]

The prevalence of stomach varices in cirrhotic patients with portal hypertension is an important issue to determine because the clinical implications of the conditions are high and not consistently reported. To further improve screening procedures and clinical outcomes, this research paper tries to assess prevalence and endoscopic appearances of stomach varices in such patients.

METHODOLOGY

This descriptive cross-sectional study was conducted in the Department of Medicine, Bolan Medical College/Hospital, Quetta, between January 15, 2025, and April 14, 2025, after obtaining the consent of the research summary. Using endoscopic outcomes, the study aimed at determining the existence of stomach varices in cirrhotic patients with portal hypertension. A total of 120 patients utilized in the study, the margin of error was 5 percent, and the confidence level was 95 percent and the expected frequency of the stomach varices was 8.49 percent as reported in the past studies.[11] The non-probability consecutive sampling method was used to recruit patients who approached the indoor medical department.

The sample included patients of either gender aged between 18 and 60 years who had already been diagnosed with portal hypertension and liver cirrhosis and were already having cirrhosis over three months. The operational criteria applied to diagnose liver cirrhosis were reduced liver size (<13 cm), splenomegaly (>13 cm), thrombocytopenia (platelet count <150 × 10^1/L), impaired hepatic synthetic functioning (albumin/globulin ratio <1 or prothrombin time >4 seconds), or APRI >1. The width of a portal vein exceeding 1315 mm in ultrasonic imaging was taken to be portal hypertension. In order to eliminate confounding factors, patients who had been treated previously at least once by variceal bleeding, had a history of stomach or duodenal ulcers, had received transjugular intrahepatic portosystemic shunt (TIPS) or shunt surgery, had undergone band ligation, or had chronic renal failure (serum creatinine >1.5 mg/dl) were excluded.

The study had all subjects giving written informed consent after approvals were made through CPSP and institutional ethical review committee. Baseline clinical and demographic data including age, gender, length of cirrhosis, place of residence (rural or urban), height, weight and body mass index (BMI) were recorded using a standardized proforma. To minimize the inter-observer variation, upper GIT endoscopy was done on all the patients by an experienced consultant gastroenterologist who had at least three years of post-fellowship experience. As per the operational definitions, gastric varices were diagnosed by characteristic endoscopic appearance (cherry red and dark red on the stomach lining).

All the data that was collected was entered and assessed using the SPSS version 25.0. Based on the data distribution determined by the Shapiro-Wilk test, quantitative variables such as age, height, weight, and length of cirrhosis were presented as mean plus standard deviation or median plus interquartile range. The qualitative characteristics (gender, place of residence, Child-Pugh class and existence of stomach varices) were represented using frequencies and percentages. Age, gender, BMI, length of cirrhosis, Child-Pugh class and place of residence were the effect modifiers that were controlled with stratification. After the stratification, the associations were compared with the chi-square test where p-value of 0.05 or less was considered statistically significant.

RESULTS

There were 120 patients in total who participated in the study and were eligible. The mean age of the study population was 45.2 ± 10.6 and the range of 18 to 60 years. There were 72 (60.0) and 48 (40.0) men and women among the patients, respectively. The median of the cirrhosis was eight months (IQR: 514 months). The mean height and weight of the patients were 167.3/ + 8.5 cm/kg and 68.4 / + 11.2 kg, respectively, and mean BMI was 24.4/ + 3.6 kg/m 2. (Table I)

Regarding the place of residence, 50 patients (41.7%) lived in the metropolitan centres and 70 patients (58.3) lived in rural centres. Fifty percent (25.0) of the patients fell into the Class A, forty (33.3) fell into the Class C, while fifty (41.7) fell into the Class B according to the Child-Turcotte-Pugh (CTP) categorization (Table II).

On upper gastrointestinal endoscopy, 24 (20.0) patients had gastric varices, and 96 (80.0) patients did not have the existence of the condition. (Table III).

Stratification analysis revealed that older patients (>40 years), men, those with longer durations of cirrhosis (>6 months), higher BMI (>25 kg/m2) and those in the rural locations had greater prevalence of gastric varices, although none was statistically significant (p > 0.05). (Table IV)

It was established that the Child-Pugh test and the presence of stomach varices showed a significant correlation. Three (10.0%) patients in Class A, eight (16.0) in Class B, and thirteen (32.5) in Class C had gastric varices (p = 0.03) implying that the prevalence increased as the severity of liver disease increased. (Table IV).

Table I

Baseline Characteristics of Study Population (n = 120)

Variable	Value
Age (years)	45.2 ± 10.6
Gender	
• Male	72 (60.0%)
• Female	48 (40.0%)
Duration of cirrhosis	8 months (IQR: 5–14)
Height (cm)	167.3 ± 8.5
Weight (kg)	68.4 ± 11.2
BMI (kg/m^2)	24.4 ± 3.6
Residence	
• Rural	70 (58.3%)
• Urban	50 (41.7%)

Table II

Distribution of Child-Pugh Class (n = 120)

Child-Pugh Class	Frequency	Percentage
A	30	25.0%
B	50	41.7%
C	40	33.3%

Table III

Frequency of Gastric Varices (n = 120)

Gastric Varices	Frequency	Percentage
Present	24	20.0%
Absent	96	80.0%

Table IV

Stratification of Gastric Varices with Effect Modifiers (n = 120)

Variable	Category	GV Present n (%)	GV Absent n (%)	p-value
Age	≤40 years	8 (16.0%)	42 (84.0%)	0.21
	>40 years	16 (22.9%)	54 (77.1%)	
Gender	Male	16 (22.2%)	56 (77.8%)	0.32
	Female	8 (16.7%)	40 (83.3%)	
Duration	≤6 months	7 (15.6%)	38 (84.4%)	0.28
	>6 months	17 (22.7%)	58 (77.3%)	
BMI	≤25 kg/m^2	10 (16.7%)	50 (83.3%)	0.19
	>25 kg/m^2	14 (23.3%)	46 (76.7%)	
Residence	Rural	16 (22.9%)	54 (77.1%)	0.27
	Urban	8 (16.0%)	42 (84.0%)	
Child-Pugh Class	A	3 (10.0%)	27 (90.0%)	0.03
	B	8 (16.0%)	42 (84.0%)	
	C	13 (32.5%)	27 (67.5%)	

DISCUSSION

In the present case, 24/120 patients (20.0%) possessed stomach varices. This is also consistent with the findings of research undertaken recently. A comparable rise in the prevalence of varices in cirrhotic patients was reported by Hussain et al[12] and Azad et al.[13] (18.3% and 17%), respectively, who reported the prevalence of varices in cirrhotic patients presenting with upper gastrointestinal hemorrhage, respectively. Just like us, Zakir et al. also showed that about 1722% of patients with cirrhosis had stomach varices.[14] These comparisons demonstrate that the prevalence of our study is consistent with the current regional and global statistics.

However, other studies have discovered slightly higher or lower rates. Lesmana CRA et al. presented a range of prevalence of 10 to 30 in an in-depth analysis and this indicates variability due to the selection of patients and the severity of the disease.[15] Similarly, Shrestha et al. should be observed to have found a lower prevalence, possibly due to inclusion of all endoscopic patients in their study and exclusion of only cirrhotic patients with portal hypertension.[15] The variations indicate the differences in prevalence due to the variables of the study population and the inclusion criteria.

The mean age of 45.2 ± 10.6 years of our study is lower than those that are found in other cohorts, such as Barbu et al. (mean age of 50 years and above),[16] but it is comparable to those reported by Hussain et al. (42.9 ± 15.6 years).[12] This difference could be explained by demographic differences in the origin and onset of the disease particularly in the developing countries where viral hepatitis is more prevalent among the youth.

We also discovered that there was a preponderance of males (60.0%), which is consistent with past studies on the community of cirrhotic individuals by Hassan et al. and Shrestha et al.[15,17] There are a higher likelihood of exposure to risk factors such as alcohol consumption and viral hepatitis amongst males.

Our study revealed a statistically significant association between stomach varices and Child-Pugh class (p = 0.03) and the prevalence of varices increased with the progression of the condition, but the prevalence rate was much higher in patients with advanced cirrhosis.[18] On the same note, Tripathi et al. and Peng et al.[19,20] claim that diminishing liver functioning and portal hypertension elevate the rate of varices and variceal hemorrhage. Indirect support of our result was provided by Hussein et al. who demonstrated significant correlation with the enhanced Child-Pugh class[12], although they were mainly examining esophagus varices.

In our study, no statistically significant association was found between stomach varices and ages, gender, BMI, duration of cirrhosis and the living place. These variables also had non-significant relationships as found by Azad et al.[13] Conversely, other studies, including Zakir et al., observed associations with demographic factors but these differences may be attributed to modification in the study design, that is, they focused on bleeding varices and not prevalence in general.[14]

Also, the recent advances in the diagnostic techniques have been examined. Despite the fact that endoscopy remains the gold standard, Li et al. revealed that computed tomography has high sensitivity (91%), and specificity (81%) to detect gastric varices.[21] This proves our study methodology that was reliant on endoscopic findings to make exact diagnosis.

All in all, the findings of this report are in conformity with previous studies, which show that gastric varices are prevalent among patients with progressive liver disease and occur in 15-25% of patients with cirrhosis. The variations in the reported prevalence across the studies are likely to be caused by differences in the study design, diagnostic criteria, and population variables.

Limitations

In assessing the findings, it should be noted that there are numerous limitations of this research. The study was a single-center one, thus not necessarily applicable to a broad population. A relatively small sample size (n=120) might be a limitation of the statistical strength of the study to detect correlations between stomach varices and various clinical variables. In addition, the cross-sectional design does not allow concluding on the chronological development of stomach varices and make causal connections. Non-probability successive sampling also may lead to selection bias. The study could have also given a more in-depth evaluation of the portal hypertension as its sole application was strongly based on the findings of the endoscopies without a correlation with imaging or hemodynamic assessments. Lastly, it was not able to measure the outcomes concerning stomach varices because there was no follow-up to assess the risk of bleeding, recurrence, or death.

CONCLUSION

Gastric varices were significant in this study with portal hypertension (20.0%) being a significant issue in cirrhotic patients. Gastric varices were demonstrated to be more

prevalent with increased hepatic disease severity and this was significantly associated with increased Child-Pugh class. However, no observable correlation was present with any clinical or demographic variables. These findings indicate that endoscopic screening of patients with cirrhosis should be an annual practice, particularly in patients with advanced disease to help in early diagnosis and proper management, hence reduce the chances of death, which is a very dangerous complication.

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