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Frequency of Esophageal Varices in Patients with Cirrhosis

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ABSTRACT

Background: Esophageal varices are a frequent and potentially life-threatening complication in patients with liver cirrhosis. Timely identification is crucial to preventing variceal bleeding and reducing morbidity. While risk stratification tools exist, their reliability varies, and demographic predictors remain inconclusive. **Objective:** To determine the frequency of esophageal varices in cirrhotic patients presenting to Lady Reading Hospital Peshawar. **Study Design:** Cross-sectional observational study. **Duration and Place of Study:** The study was conducted from September 2023 to March 2024 at the Department of Gastroenterology, Lady Reading Hospital, Peshawar. **Methodology:** A total of 131 adult patients with ultrasound-confirmed cirrhosis were enrolled based on clinical signs and radiologic findings. Patients with prior GI bleeding, variceal treatment, or hematologic conditions were excluded. All participants underwent upper GI endoscopy for the identification and grading of esophageal varices. **Results:** Most patients were male, and a high prevalence of esophageal varices was observed. Varices were graded as small, medium, or large based on established endoscopic criteria. No statistically significant associations were found between the presence of varices and patient age, gender, or cirrhosis duration. **Conclusion:** Esophageal varices are highly prevalent in cirrhotic patients, with no significant link to demographic factors.

INTRODUCTION

Cirrhosis is a progressive and chronic disease that entails fibrosis and structural distortion of the liver's parenchyma leading to the formation of regenerative nodules.[1] The disease is caused by repeated liver injury due to various etiologies such as chronic viral hepatitis, excessive use of alcohol, non-alcoholic fatty liver disease, and autoimmune hepatitis.[2] Long-standing cirrhosis induces a fall in hepatic function and triggers complications such as portal hypertension, coagulopathy, ascites, hepatic encephalopathy, and increased risk of infections.[3] The clinical presentation of cirrhosis is variable and may range from compensated to decompensated states, and decompensated status is accompanied by a more negative prognosis and increased risk of mortality.[4]

Esophageal varices are dilated submucosal veins of the lower part of the esophagus that are caused almost entirely as a result of portal hypertension, a frequent complication of cirrhosis.[5] Esophageal varices are developed as collateral channels to redirect portal blood flow as resistance accumulates in the liver. Generally silent early in course, they represent a grave clinical danger due to their propensity to bleed catastrophically and cause lethal upper gastrointestinal bleeding.[6] Bleeding risk is associated with variceal size, red wale signs at endoscopy, and severity of liver dysfunction, often determined with the Child-Pugh score.[7] Early detection and appropriate prophylaxis with a non-selective beta-blocker or endoscopic band ligation are essential in preventing presentation and recurrent bleeding.[8]

Frequency of esophageal varices in patients with cirrhosis is substantial, with studies reporting prevalence rates ranging from 30% to 60% depending on the stage of liver disease.[9] In patients with decompensated cirrhosis and significant portal hypertension, this figure is even higher.[10] The development of esophageal varices signifies a critical transition in disease severity and is an important predictor of poor outcomes.[11] Routine surveillance via upper gastrointestinal endoscopy is therefore recommended in all cirrhotic patients upon diagnosis and at regular intervals thereafter.[12] Early identification enables timely intervention, reducing the incidence of variceal bleeding, which remains a major cause of morbidity and mortality in this population.[13]

A study conducted by Duah A et al. reported that 90.6% of individuals with liver cirrhosis were found to have esophageal varices.[14]

Given the significant risk of death associated with variceal bleeding, one of the central objectives in the clinical management of cirrhotic patients is to prevent such hemorrhagic events. Current guidelines from the

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American Association for the Study of Liver Diseases recommend routine endoscopic screening for both esophageal and gastric varices in all patients newly diagnosed with cirrhosis. However, there is a lack of published data on the burden of esophageal varices among cirrhotic individuals specifically in the Khyber Pakhtunkhwa (KPK) region. This study was therefore conducted to assess the prevalence of esophageal varices in patients with liver cirrhosis in this population.

METHODOLOGY

This cross-sectional study was conducted at the Department of Gastroenterology, Lady Reading Hospital Peshawar, from September 2023 to March 2024. A total of 131 patients were enrolled. Sample size was estimated using WHO sample size calculation software, applying a 95% confidence interval, 5% margin of error, and an expected prevalence of esophageal varices in cirrhotic individuals of 90.6%.[14]

Eligible patients included adults aged 18 to 60 years, of either gender, who showed clinical signs of chronic liver disease such as jaundice, abdominal swelling, or peripheral edema. Radiological evidence of cirrhosis was established on ultrasound through findings of surface nodularity and a coarse, heterogeneous liver texture. Individuals were excluded if they had a known history of upper gastrointestinal bleeding, had been treated with non-selective beta-blockers such as propranolol, or had previously undergone an upper GI endoscopy. Patients who had received a blood transfusion within the previous four weeks, as well as those diagnosed with hepatocellular carcinoma, aplastic anemia, idiopathic thrombocytopenic purpura, or other hematologic disorders associated with thrombocytopenia, were also excluded.

After obtaining institutional ethical approval (Ref: No. 839/LRH/MTI) and written informed consent, demographic data including age, gender, and duration of liver disease were recorded. Each participant underwent an upper gastrointestinal endoscopic examination, performed by a consultant gastroenterologist with no less than three years of post-fellowship clinical experience. During the procedure, esophageal varices were identified and classified by their size. Small varices were defined as minimally raised venous channels, up to 0.5 cm above the mucosal surface. Medium-sized varices were described as dilated, tortuous veins occupying less than one-third of the esophageal lumen. Large varices were identified when these dilated vessels extended over more than one-third of the lumen. Endoscopic findings were recorded systematically on a structured data sheet designed for the study.

Data entry and analysis were performed using IBM SPSS version 26. Quantitative variables such as age and duration of cirrhosis were expressed as mean values with standard deviations. Categorical variables including gender and the presence or size of esophageal varices were presented as frequencies and percentages. Stratified analysis was conducted for age groups, gender, and cirrhosis duration to evaluate any associations with variceal presence and severity. Chi-square testing was applied where appropriate, with a p-value of ≤0.05 considered statistically significant.

RESULTS

The mean age of the patients was 48.73 years with a standard deviation of 7.56 years, and the mean duration of cirrhosis was 25.63 months with a standard deviation of 12.49 months (as shown in Table-I). The majority of the patients were male, comprising 72.5% of the cohort, while females accounted for 27.5% (as shown in Table-I).

Table I

Patient Demographics

Demographics	Mean ± SD or n (%)
Age (years)	48.73 ± 7.56
Duration of Cirrhosis (months)	25.63 ± 12.49
Gender	
Male n (%)	95 (72.5%)
Female n (%)	36 (27.5%)

In terms of the presence of esophageal varices, 84.70% of the patients had varices, while 15.30% did not (as shown in Table-II). The grading of esophageal varices revealed that 15.30% had no varices, 30.50% had small varices, 28.20% had medium varices, and 26.00% had large varices (as shown in Table-II).

Table II

Frequency and grades of Esophageal Varices

Esophageal Varices	Frequency	Percentage
Yes	111	84.70%
No	20	15.30%
Grade of Varices		
None	20	15.30%
Small	40	30.50%
Medium	37	28.20%
Large	34	26.00%

When stratified by demographic factors, the presence of esophageal varices was not significantly associated with age group (p=0.772), gender (p=1.000), or duration of cirrhosis (p=1.000) (as shown in Table-III). Specifically, among patients aged ≤40 years, 87.0% (20 out of 23) had varices compared to 84.3% (91 out of 108) of those aged >40 years. In terms of gender, 84.2% (80 out of 95) of males and 86.1% (31 out of 36) of females had varices. Regarding the duration of cirrhosis, 86.2% (25 out of 29) of patients with a duration of cirrhosis ≤12 months had varices compared to 84.3% (86 out of 102) of those with a duration >12 months (as shown in Table-III).

Table III

Association of Esophageal Varices with Demographic Factors

Demographic Factors	Esophageal Varices		p-value
	Yes n(%)	No n(%)	
Age group (years)			
≤40	20 (87.0%)	3 (13.0%)	0.772*
>40	91 (84.3%)	17 (15.7%)	
Gender			
Male	80 (84.2%)	15 (15.8%)	1.000*
Female	31 (86.1%)	5 (13.9%)	
Duration group (months)			
≤12	25 (86.2%)	4 (13.8%)	1.000*
>12	86 (84.3%)	16 (15.7%)	

*Fischer Exact Test

DISCUSSION

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The results revealed a high prevalence of esophageal varices among cirrhotic patients, with 84.70% presenting with varices. This high prevalence underscores the significant burden of esophageal varices in this patient population, highlighting the need for vigilant monitoring and management to prevent complications such as variceal bleeding.

The grading of esophageal varices showed that 30.50% had small varices, 28.20% had medium varices, and 26.00% had large varices. The presence of larger varices in a substantial proportion of patients is particularly concerning, as larger varices are generally associated with a higher risk of bleeding and subsequent complications. This finding suggests that a significant number of cirrhotic patients may be at risk for clinically significant variceal bleeding, emphasizing the importance of early detection and intervention.

Patient mean age and mean duration of cirrhosis were 48.73 ± 7.56 years and 25.63 ± 12.49 months, respectively. Predominance of males was noted in a majority of patients (72.5%), and females formed 27.5%. These population-based findings agree with those reported by Syeda Zainab et al., [15] who reported 46.79 ± 7.59 years as a mean age and 60.5% male predominance. Our study, however, encompassed a slightly older-aged population with a greater proportion of male patients, possibly due to local differences or variations in healthcare-seeking behavior.

The prevalence of esophageal varices in our cohort was 84.7%, which is higher than the 62.65% reported by Asma Abdul Razzak et al. [16]. This discrepancy may be due to differences in study populations, inclusion criteria, or regional risk factors. In terms of grading, our findings showed that 30.5% of patients had small varices, 28.2% had medium varices, and 26.0% had large varices. These figures are comparable to the study by Imran Anwar Khan et al. [19], who reported 39.6% grade I, 24% grade II, and 36.4% grade III varices. The relatively higher proportion of small varices and lower proportion of large varices in our study could indicate earlier detection or less severe disease progression.

Stratified analysis showed no significant association between the presence of esophageal varices and age group ($p = 0.772$), gender ($p = 1.000$), or duration of cirrhosis ($p = 1.000$). These findings contrast with those of Dr. Habibullah Jan et al. [17], who found a significant correlation between splenic size and gastroesophageal varices ($p < 0.05$), suggesting that splenomegaly may be a stronger predictive factor than demographic variables. Furthermore, our results differ from Imran Anwar Khan et al. [19], who noted a significantly higher prevalence of varices in males ($p < 0.01$). These variations may be due to different underlying etiologies of cirrhosis, such as hepatitis B or C, which may influence variceal development.

Unlike the study by Yang-Chun Du et al. [18], our study did not incorporate non-invasive markers like the platelet count-to-spleen diameter ratio (PSR) or platelet count-to-spleen volume ratio (PSVR). Du et al. demonstrated that the combination of PSR and PSVR provided the highest area under the ROC curve for predicting severe varices [18]. This highlights an opportunity for future research to explore the utility of non-invasive predictive tools in our patient population.

Although we have not scrutinized management strategies extensively, our findings are concurrent with Sofia Simona Jakab and Guadalupe Garcia-Tsao [20], who emphasize early screening, application of non-selective beta-blockers, and endoscopic variceal ligation as a method of primary bleeding prevention in cirrhotics. The extremely high prevalence of varices in our study highlights that those interventions should be adopted early before serious consequences result.

Lastly, our findings are congruent with a study by Cosmas Rinaldi Adithya Lesmana et al. [21], who stress that preexisting liver disease should be managed to prevent varices growth and appearance. The lack of a significant correlation with demographic variables in our investigation further supports that wide-scale screening and risk stratification should never be reduced to mere demographic profiling.

Our study detected a wide prevalence of varices among cirrhotic subjects and a prevalence of variceal grades that is extensively congruent with that previously detected in literature. The observation that we detected no obvious correlation with demographical variables shows that variceal formation is linked with multifactorial mechanisms. Future investigations should be aimed at confirmation of a non-invasive predictive score and a deeper investigation of clinical markers that might improve early detection and treatment.

Nonetheless, there are several limitations to this study. The study took place at a single center and therefore might not be generalizable to more diverse patient groups. The sample size, though sufficient to allow analysis, might not be representative of all prospective associations. The study also failed to utilize non-invasive prediction devices or determine clinical outcome measures following variceal detection and therefore these might be worth investigating further in future studies.

CONCLUSION

Our study found that esophageal varices are observed to have very high prevalence among cirrhotic patients regardless of age, sex, and disease duration. The observation of absent firm correlations with these demographic parameters leads us to a conclusion that screening via endoscopy should be a routine feature in all cirrhotic patients and not be reliant only on patient-specific risk factors. Early detection and early treatment still hold a cardinal position in evading such complications and improving patient survival.

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