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NON-ENDOSCOPIC ASSESSMENT OF ESOPHAGEAL VARICES IN LIVER CIRRHOSIS

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Abstract

Objective: To determine the frequency and non-endoscopic predictors of esophageal varices in liver cirrhosis patients at a tertiary care hospital. Study Design: Cross-sectional. Setting & Duration: Department of Gastroenterology, Liaquat University of Medical and Health Sciences, Jamshoro. Methodology: This observational study included 109 liver cirrhosis patients. Each underwent clinical assessment, laboratory tests, portal vein Doppler, and upper GI endoscopy to confirm esophageal varices. Data were analyzed using SPSS v26. Quantitative variables were expressed as mean ± SD; qualitative variables as frequencies and percentages. Results: Mean age was 45 ± 14.32 years; 65.1% were male. Child-Pugh classification showed 36% Class A, 30.4% Class B, and 33.6% Class C. Ascites (80%) was the most common cirrhosis presentation. Esophageal varices were found in 52.2% of patients, with Grade III being most common. Significant non-endoscopic predictors included age, gender, Child-Pugh class, splenomegaly, portal vein diameter, serum albumin, bilirubin, platelet count, and Hepatitis B/C status. Conclusion: Non-invasive clinical, biochemical, and radiological markers can help predict esophageal varices, potentially reducing the need for routine endoscopy.

INTRODUCTION

A typical side effect of liver cirrhosis is esophageal varices, which carry a significant risk of serious and potentially fatal bleeding[1]. Although endoscopy is the accepted technique for identifying and classifying esophageal varices, its invasiveness may have a detrimental effect on patient comfort and overall results[2]. In order to improve patient stratification and treatment results by early intervention and surveillance, researchers have looked for non-endoscopic predictors of esophageal varices in patients with liver cirrhosis[3]. Many non-endoscopic variables have been investigated, including age, gender, splenomegaly, portal vein diameter, Child-Pugh score, serum albumin level, platelet count, and splenomegaly[4]. These predictors, which come from radiographic, laboratory, and clinical data, provide easy-to-use ways to incorporate them into clinical practice[5]. Healthcare professionals can proactively control the risk of variceal bleeding by using these predictors to assess the existence and severity of esophageal varices, which may improve patient outcomes[6]. Improving patient health and reducing the burden of this serious liver cirrhosis consequence depend heavily on the prompt detection and treatment of esophageal varices [7].

The presence of esophageal varices in cirrhotic patients has been linked to splenomegaly, low platelet counts, and expanded portal vein diameter.

Furthermore, the Child-Pugh score, which evaluates the severity of liver illness, has also been found to be a predictor of esophageal varices.[6] Additionally, it has been determined that male gender, advanced age, and low blood albumin levels are possible indicators.[7] The limits of these non-endoscopic indicators in precisely predicting the existence or severity of esophageal varices must be acknowledged, though.[8]Non-endoscopic predictors are useful clinical practice adjuncts that help identify patients who need additional assessment and monitoring, potentially improving treatment results even if endoscopy is still the gold standard for diagnosis.[9]The identification and application of non-endoscopic predictors may improve patient outcomes in spite of these drawbacks. Healthcare professionals can enhance risk categorization, enable early intervention, and maximize surveillance tactics for patients with liver cirrhosis by integrating these indicators into standard clinical evaluations.[10] By taking a proactive action, esophageal varices can be promptly managed, lowering the risk of variceal hemorrhage and the morbidity and mortality that come with it. Endoscopy facilities are scarce, costly, and the workload is heavy in a developing nation like Pakistan. Additionally, because endoscopy is intrusive, people are afraid of it. While awaiting diagnostic and/or therapeutic endoscopy, noninvasive predictors can be useful as a screening tool to assist doctors in starting medication therapy to stop variceal hemorrhage. **The objective of the study is to determine the frequency and associated factors of esophageal varices in liver cirrhosis patients at a tertiary care hospital, focusing on identifying non-endoscopic predictors.**

Methodology:

This study was carried out over a period of six months in the department of Gastroenterology, Liaquat University of Medical and Health Sciences, Jamshoro after approval from IRB of hospital. After taking written informed consent, 109 patients of liver cirrhosis patients of either gender having age between >16-80 years, without previous history of esophageal varices or bleeding and had not undergone endoscopic examination in the past six months were included via non-probability consecutive sampling technique. Patients with history of variceal bleeding or band ligation, hepatic encephalopathy, previous or current treatment with beta blockers and diuretics, ascites or portal vein thrombosis detected by ultrasonography were not included.

"Diagnosis of liver cirrhosis was based on the presence of two or all three of the following:[11]

1. Clinical signs of chronic liver disease (clubbing, palmar erythema, spider naevi, gynaecomastia, distended abdominal veins, female pubic hair pattern, encephalopathy, splenomegaly or ascites)
2. Impaired liver function test consistent with cirrhosis (elevated INR, and low serum albumin)
3. Ultrasound diagnosis of cirrhosis (Shrunken or enlarged nodular liver with increased echotexture, a blunt edge, and distorted architecture, with or without a dilated portal vein, thickened gallbladder wall, splenomegaly or ascites)"

Every participant provided written, informed consent. Every patient had a thorough history and examination. Blood sample were obtained and sent to laboratory for assessing the serum bilirubin, albumin, international normalized ratio (INR), alanine aminotransaminase (ALT), asparate aminotransaminase (AST), platelet count, and ELISA for HBsAg and anti-HCV. Abdominal ultrasound (US) was used to measure the size of the liver, spleen, portal vein (PV), and ascites.

Endoscopic evaluation of all patients was done by a senior gastroenterologist and varices were graded as; "Grade 1: Varix is flush with the wall of the esophagus, Grade 2: Protrusion of the varix but not more than half way to the lumen center, Grade 3: Protrusion more than halfway to the center and Grade 4: The varices are so large that they meet at the midline".

SPSS-26 was used for data analysis. Mean ± SDs were reported for quantitative variables. Frequency and percentages were calculated for qualitative data. Chi-square test was applied to compare the Non-Endoscopic Predictors in patients with varices and without varices. A p-value of less than 0.05 was considered as significant.

Results:

A total of 109 patients of liver cirrhosis were included in this study, the mean age of the patient was 45 + 14.32 years. Most of the patients were male i.e. 71 (65.1%) and 38 (34.9%) were female. 39 (36%) of the

patients had child Pugh class-A, 33 (30.4%) had Class-B and 37 (33.6%) had Class-C. The most common indication of cirrhosis was ascites 87 (80%) followed by other indications. 57 (52.2%) of the patients had varices and most of the patients had grade-III varices, **as shown in table#1**

Table#1: Demographic Data of the Patients (n=109)

Demographic Data	**n (%)/(mean ± sd)**
Age (mean ± sd)	45 ± 14.32
Gender	
• Male	71 (65.1%)
• Female	38 (34.9%)
Child Pugh class	
• Class-A	39 (36%)
• Class-B	33 (30.4%)
• Class-C	37 (33.6%)
Indications of Cirrhosis:	
• Ascites	87 (80%)
• Jaundice	46 (42%)
• Haematemesis	68 (62%)
• Melaena stool	44 (40%)
• Weight Loss	21 (19%)
• Pedal oedema	26 (24%)
• Hepatic encephalopathy	20 (18%)
• Anorexia	25 (23%)
Grades of Varices:	
• Grade-I	08 (7.8%)
• Grade-II	7 (6.1%)
• Grade-III	24 (21.9%)
• Grade-IV	18 (16.7%)
• None	52 (47.4%)

Comparison of Non-Endoscopic Predictors in Cirrhosis Patients with and without varices has been made **in table#2**, shows that 32 (56.14%) of the patients ≥ 40 had varices (P-value = 0.01). 50 (87.7%) male and 7 (12.3%) had varices, with significant association, p-value=0.00. 7 (12.2%) of the varices patients had Class-A, 23 (40.3%) had class-B and 27 (47.3%) had class-C (p-value=0.00). 16 (29%) of the varices patients had mild splenomagly 16 (29%), 11 (20%) had moderate and 30 (51%) had severe (p-value=0.001). Portal vein diameter greater than 13mm was in 82.4% cases and less in 13mm in 17.5%) cases (p-value=0.008). Serum albumin was in Less than 3.5 g/dL was 19 933%) cases and greater than in 38 (67%) cases (p-value = 0.000). Serum Bilirubin (Bili) < 2 mg/dl was in 08 (36%), 2-3 mg/dl

In 22 (29%) and ≥ 3 mg/dl in 27 (35%) (P-value= 0.00). **Platelet Counts** Less than 100,000 cells/µL were in 16 (28.7%) and 100,000 cells/µL or more in 41 (71.9%) with p-value 0.00. Further, hepatitis-B found in 36 (70%) cases, Hepatitic-C in 34 (60%) cases and Hepatitic B & C in 11 (20%) cases.

Table#2: Comparison of Non-Endoscopic Predictors in Cirrhosis Patients with and without varices (n=109)

Non-Endoscopic Predictors	Varices (n=57)	No Varices (n=52)	P-value
Age (years)			
• ≤ 40	25 (43.8%)	41 (78.8%)	0.01
• >40	32 (56.14%)	11 (21.5%)	
Gender			
• Male	50 (87.7%)	21 (40.3%)	0.00
• Female	07 (12.3%)	31 (59.6%)	
Child Pugh class			
• Class-A	07 (12.2%)	32 (61.5%)	
• Class-B	23 (40.3%)	10 (19.2%)	0.00
• Class-C	27 (47.3%)	10 (19.2%)	
Spleen size and Splenomegaly			
Present	16 (29%)	31 (60%)	
• Mild	11 (20%)	9 (17%)	0.001
• Moderate	30 (51%)	12 (23%)	
• Severe			
Portal Vein diameter			
• Less than 13 mm			
• 13 mm or more	10 (17.5%)	21 (40.3%)	0.008
	47 (82.4%)	31 (59.6%)	
Serum Albumin (Alb)			
• Less than 3.5 g/dL	19 (33%)	37 (72%)	0.000
• 3.5 g/dL or more	38 (67%)	15 (28%)	
INR ratio:			
INR <2.2	29 (50.8%)	35 (67.3%)	0.08
INR >2.2	28 (49.1%)	17 (32.6%)	
Serum Bilirubin (Bili)			
• < 2 mg/dl	08 (36%)	24 (46%)	0.00
• 2-3 mg/dl	22 (29%)	16 (30%)	
• ≥ 3 mg/dl	27 (35%)	12 (24%)	
Platelet Counts			
• Less than 100,000 cells/µL	16 (28.7%)	39 (75%)	0.00
• 100,000 cells/µL or more	41 (71.9%)	13 (25%)	
Hepatitis-B			
• Yes	36 (70%)	29 (50.8%)	0.05
• No	16 (30%)	28 (49.1%)	
Hepatitis-C			
• Yes	34 (60%)	21 (40%)	0.044
• No	23 (40%)	31 (60%)	
Hepatitis-B & C			
• Yes	11 (20%)	16 (32%)	0.165

• No	46 (80%)	36 (68%)	

Discussions:

Nearly 27,000 people died each year from cirrhosis and chronic liver disease in 2001, making them the 10th and 12th leading causes of mortality for men and women, respectively .[11] About 3.6 out of every 1000 persons has cirrhosis, which causes 32,000 deaths annually. Additionally, it causes over a million hours of lost work time. One important contributing factor to the morbidity and mortality associated with cirrhosis is the incidence of variceal hemorrhage, which is a direct result of portal hypertension. Mortality is roughly 30% and is associated with active variceal hemorrhage events. Furthermore, survivors are 70% more likely to have another hemorrhage at one year following an episode of active bleeding.[12]

The mean age of the patients in this research was 45 + 14.32 years, which was not associated with the occurrence of esophageal varices. Duah A et al,also showed similar findings[13].

In centers without endoscopic equipment, low platelet counts, splenomegaly, and elevated total bilirubin may be employed as surrogate markers for the existence of esophageal patients with liver cirrhosis and to predict esophageal varices14. Other authors have also made similar suggestions[15].

According to our research, there is a substantial correlation between esophageal varices and laboratory indicators such as splenomegaly, elevated serum albumin, total bilirubin, and platelet count (thrombocytopenia). Similarly, a study by Mahmood K et al. demonstrated a substantial correlation between esophageal varices, splenomegaly, elevated total bilirubin, and platelet count (thrombocytopenia).[16] Splenomegaly by itself was a strong predictor of the development of big esophageal varices, according to Amarapurkar et al.[17] In a prospective research, Sharma et al.[18] found that the prevalence of large varices was independently predicted by platelet count and splenomegaly. A study by Mattos AZ et al.[19] demonstrated that the platelet count and splenic diameter ratio are insufficient to predict esophageal varices in cirrhotic individuals, despite the fact that few studies need additional extensive assessment. Platelet count as a predictor of esophageal varices was not demonstrated by Qamar AA et al. Additionally, Duah A and colleagues were unable to demonstrate a correlation between elevated total bilirubin and platelet count splenomegaly.[13,20]

Suraj Uppalapati S found that the presence of esophageal varices may be predicted by the size and dilatation of the portal veins as determined by ultrasonography.[21] The present study further corroborates the results of this study.

According to our research, esophageal varices are linked to a high Chid Pugh Class. According to comparable findings, cirrhotic individuals with Chid Pugh Class grades B and C had extensive varices (Shrestha A et al., 22; Thapa PB et al., 23; & Gomaa AA et al., 24). However, Tafarel JR et al.25 demonstrated that Child-Pugh ratings are not effective non-endoscopic EV predictors.

We found no correlation between esophageal varices and total protein or INR (International Normalized Ratio). Hsieh et al.'s study also found no correlation between esophageal varices and INR; however, Arulselvan V's study found a correlation between esophageal varices and PT/INR.[26]

The primary methods used to diagnose liver cirrhosis were radiologic, laboratory, and clinical tests. Since alternative causes of portal hypertension, such as portal vein thrombosis, Budd-Chiari syndrome, early stage schistosomiasis, etc., that result in OV may have been included; this diagnosis approach without a histologic basis may be less accurate. Despite the possibility of selection bias introduced by the sampling method, all patients who met our eligibility criteria were chosen.

Conclusion;

Our study suggests that noninvasive biochemical and radiological markers can be utilized to non-endoscopically detect varices in low-resource areas. If at least one radiological and one biochemical parameter are found in patients with liver cirrhosis, it

could be more prudent to **refer all patients for endoscopy.**

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AUTHORS CONTRIBUTION:
MQ: Concept of work, data acquisition.

SK: Concept of work, Data analysis and interpretation

IH: Drafting of work, Data analysis and interpretation

AK: Drafting of work, critical revision and final approval

AK: Data analysis and interpretation, critical revision

DK: Critical revision and final approval

AP: Critical revision and final approval

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