

# Evaluation of Non-endoscopic Parameters for the Detection of Esophageal Varices in Patients of Liver Cirrhosis, Confirmed by Endoscopy

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## ABSTRACT

**Introduction:** Esophageal varices are generally the most common clinical manifestation of portal hypertension in Patients of liver cirrhosis. Most common causes of death in liver cirrhosis are hemorrhage from esophageal varices. The present study has been carried out to identify clinical, biochemical and ultrasonographic parameters which might non-invasively predict the existence and the risk of variceal bleed.

**Material and Methods:** The present prospective observational study was conducted in 2 years among 100 patients suffering from liver cirrhosis above 18 years of age. Detailed history, clinical examination, investigations to fulfill the inclusion and exclusion criteria of all patients was taken. Different non endoscopic parameters were taken Plateletcount, Coagulation profile, Ultrasonography whole abdomen, Child-Pugh-Torcotte (CPT) Score, AST to platelet ratio index (APRI) for the detection of esophageal varices and its grading in liver cirrhosis patients which was confirmed by endoscopy.

**Results:** There was significant association of presence of esophageal varices in liver cirrhosis patients with presence of icterus, presence of ascites, presence of splenomegaly, grade of Child Pugh Score, AST to Platelet rationdex (APRI score) Prothrombin Time and International Normalized Ratio (PT/INR), mean TB (mg/dl), mean spleen size.

**Conclusions:** The result of present study concluded that some parameters are strongly associated with grades of varices and could be useful for early detection and subsequent management of varices.

**Keywords:** Esophageal Varices, Liver Cirrhosis, Non Endoscopic Parameters, Child Pugh Score

development of new varices and increase in grades of varices is 8% per year; the former is largely predicted by a hepatic venous pressure gradient (HVPG) exceeding 10 mm Hg and the latter by the presence of decompensated cirrhosis, alcohol etiology and red flag signs.<sup>8-10</sup> Large size varices, the presence of red flag signs, severe liver disease and portal pressure greater than 12 mm Hg predict greater risk of bleeding.<sup>9,10</sup> Mortality rate of an episode of esophageal varical bleeding is approximately 20% at six weeks.<sup>11</sup>

The most reliable and accurate method to detect the presence of large esophageal varices is an upper gastrointestinal endoscopy.<sup>8,10,11</sup> It is now recommended that all patients with established cirrhosis should be screened by upper gastrointestinal endoscopy for the presence of varices at the time of diagnosis.<sup>10-13</sup> Certain clinical, biochemical and ultrasonographic parameters either singly or in combination have good predictive power for non-invasively assessing the risk of bleeding from varices.<sup>11,13</sup> However, the factors that predict the presence of varices are not as well defined. Hence the present study was conducted to assess non-endoscopic parameters for the detection of esophageal varices in patients of liver cirrhosis, confirmed by endoscopy.

## MATERIAL AND METHODS

A study of 100 patients suffering from liver cirrhosis admitted

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in Chhatrapati Shivaji Subharti hospital after obtaining written informed consent from parents and approval from Institutional Ethical Committee. Detailed history, clinical examination, investigations to fulfill the inclusion and exclusion criteria of all patients were taken.

#### Inclusion criteria

- All patients above 18yrs of age.
- All patients suffering from liver cirrhosis.

#### Exclusion criteria

- Hepatocellular carcinoma patients
- Thrombocytosis or thrombocytopenia due to other cause
- Chronic kidney disease
- Any other disorder deranging the coagulation profile
- Myocardial infarction

Grade of CPS	N (%)
A	34 (34.0)
B	11 (11.0)
C	55(55.0)

**Table-1:** Distribution of the study participants by grade of CPS

Grade of esophageal varices	N (%)
0	28 (28.0)
1	10 (10.0)
2	7 (7.0)
3	55 (55.0)

**Table-2:** Distribution of the study participants by grade of esophageal varices on endoscopy

- Septicemia
- Previous sclerotherapy /banding for oesophageal varices
- Patients below 18years
- Patient not giving consent

History included details and duration of jaundice, ascites, pedal oedema, gastrointestinal bleed, presence or absence of splenomegaly and hepatic encephalopathy. Non-invasive parameters for oesophageal varices included platelet count, coagulation profile and ultrasonography of whole abdomen.

#### STATISTICAL ANALYSIS

Data entry, data cleaning & data analyses was done by Statistical Package for Social Sciences (version 20.0; SPSS). Output indicators were analysed through the software and results were subsequently presented in form of tables & graph. The p-value of <0.05 was considered statistically significant.

#### RESULTS

Out of the total study participants, in majority disorientation due to hepatic encephalopathy was present (65%) and in the remaining, it was absent (35%) (graph 1). Out of the total study participants, majority had a CPS grade C (55.0%); 34% had grade A and only a small proportion had grade B (11.0%) as shown in table 1.

Out of the total study participants, grade 0 varices was present in 28%; grade 1 in 10%; grade 2 in 7% and grade 3 in more than half (55%) of the study participants (table 2).

There was no significant association between presence of disorientation due to hepatic encephalopathy and the

Parameters	Grade of varices N (%)				P-value
	0	1	2	3	
Hepatic encephalopathy					
Present	22(34.4)	7 (10.9)	6 (9.4)	29 (45.3)	0.082
Absent	6 (16.7)	3 (8.3)	2 (5.5)	25 (69.4)	
Ascites					
Present	7 (10.9)	4 (6.3)	2 (3.1)	51 (79.7)	0.0001*
Absent	21 (58.3)	6 (16.7)	5 (13.9)	4 (11.1)	

\*: Statistically significant

**Table-3:** Association between presence of hepatic encephalopathy and grade of esophageal varices

Grade of CPS	Grade of varices N (%)				P-value
	0	1	2	3	
A	26 (76.5)	7 (20.6)	1 (2.9)	0 (0.0)	0.001*
B	3 (27.3)	3 (27.3)	5 (45.5)	0 (0.0)	
C	0 (0.0)	0 (0.0)	1 (1.8)	54 (98.2)	

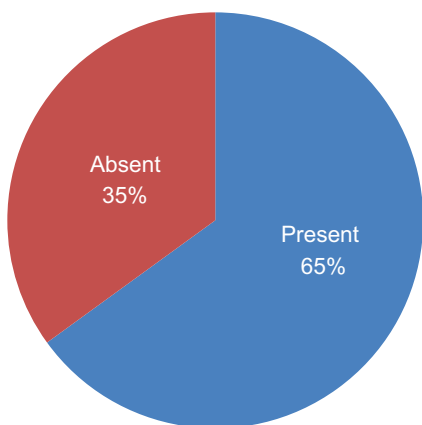
\*Statistically significant

**Table-4:** Association between grade of CPS and grade of esophageal varices

Grade	Mean APRI	P-value
Grade 0	0.23	0.03*
Grade 1	0.47	
Grade 2	1.39	
Grade 3	2.12	

\*Statistically significant

**Table-5:** Association between mean APRI score and grade of esophageal varices



**Figure-1:** Distribution of the study participants by presence of hepatic encephalopathy

grades of esophageal varices ( $P=0.082$ ). Grade 3 varices were present in 45.3% of those who had and in 69.4% of those who did not have presence of hepatic encephalopathy. Similarly, grade 0 varices were seen in 34.4% of those who had and 16.7% of those who did not have presence of hepatic encephalopathy. There was significant association between presence of ascites and the grades of oesophageal varices ( $P=0.0001$ ). Grade 3 varices was present in 79.7% of those who had and in 11.1% of those who did not have presence of ascites. Similarly, grade 0 varices were seen in 10.9% of those who had and 58.3% of those who did not have presence of ascites (table 3).

There was significant association between grade of CPS and the grades of esophageal varices ( $P=0.001$ ). Almost all (98.2%) study subjects with Grade C CPS had grade 3 varices. Among those with Grade B CPS, 27.3% had grade 0 varices; 27.3% had grade 1 varices and 45.5% had grade 2 varices. None of them had grade 3 varices. Among those with Grade A CPS, 76.5% had grade 0 varices; 20.6% had grade 1 varices and 2.9% had grade 2 varices. None of them had grade 3 varices (table 4).

There was significant association between mean APRI score and the grades of oesophageal varices ( $P=0.03$ ). In those who had grade 3 varices, the mean APRI score was 2.12. In those who had grade 0 varices, the mean APRI score was 0.23. With increasing grades of varices, the mean APRI score increased (table 5).

## DISCUSSION

Esophageal varices are extremely dilated sub-mucosal veins in the lower third of the esophagus.<sup>14,15</sup> They are most often a consequence of portal hypertension, commonly due to cirrhosis; people with esophageal varices have a strong tendency to develop severe bleeding which left untreated can be fatal.<sup>15,16</sup> Esophageal varices are typically diagnosed through an esophagogastroduodenoscopy.

### Key findings of the current study

1. There was significant association between presence of ascites and the grades of oesophageal varices ( $P=0.0001$ ).
2. There was significant association between presence of

splenomegaly and the grades of oesophageal varices ( $P=0.001$ ).

3. There was significant association between grade of CPS and the grades of oesophageal varices ( $P=0.001$ ).
4. There was significant association between APRI score and the grades of oesophageal varices ( $P=0.03$ ).
5. There was significant association between Prothrombin time and international normalized ratio (INR) and the grades of oesophageal varices ( $P=0.001$ ).
6. There was significant association between mean spleen size and the grades of oesophageal varices ( $P<0.0001$ ).

Cherain JV et al<sup>17</sup> found low platelet count, Child Pugh class B/C, spleen diameter and portal vein diameter as independent predictors for the presence of varices. Chang MH et al<sup>18</sup> reported that the variables associated with the presence of large esophageal varices were the presence of ascites, splenomegaly, Child-Pugh class, platelet count, prothrombin time, and albumin. Singh M et al<sup>19</sup> revealed that patients in varices group had a lower mean platelet count, higher mean bilirubin levels, higher mean spleen diameter and higher mean portal vein diameter.

Nashaat EH et al<sup>20</sup> showed that OV grade had a significant inverse correlation with WBCs count, Platelets count as well as Platelet count/Splenic diameter ratio and a positive significant correlation with Mean splenic bipolar diameter (MSBD), Child Pugh's classification grade. Prihatini J et al<sup>85</sup> found that platelet count, portal vein diameter and spleen size were predictive factors for esophageal varices in liver cirrhosis. Thomopoulos KC et al<sup>21</sup> reported that variables associated with the presence of large oesophageal varices were the presence of ascites and splenomegaly either by clinical examination or by ultrasound, the presence of spiders, platelet count and bilirubin.

## CONCLUSION

The most accurate method for evaluating the presence and severity of esophageal varices is endoscopy which is an invasive procedure and is costly and not available in all centers. Several alternative noninvasive techniques have been proposed to assess portal hypertension and varices, including serum biomarkers and imaging techniques. We found that some parameters are strongly associated with grades of varices and could be useful for early detection and subsequent management of varices. There was significant association with presence of icterus, presence of ascites, presence of splenomegaly, grade of Child Pugh Score, AST to Platelet ratio index (APRI score) Prothrombin Time and International Normalized Ratio (PT/INR), mean TB (mg/dl), mean spleen size which were further confirmed by endoscopy.

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