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General Medicine

NON INVASIVE PREDICTORS OF ESOPHAGEAL VARICES IN PATIENTS WITH CHRONIC LIVER DISEASE SHORT OBSERVATIONAL STUDY.

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ABSTRACT Cirrhosis, is a final pathway for a wide variety of chronic liver diseases. Chronic liver disease of any etiology can result in portal hypertension. Portal hypertension leads to the formation of porto - systemic collaterals including gastroesophageal varices. A major cause of death in patients with cirrhosis is gastrointestinal hemorrhage. Esophago-gastroduodenoscopy is the gold standard for the detection of esophageal varices, but several non invasive predictors of esophageal varices can be studied for the prediction of esophageal varices and those at risk of bleeding.

Aims and objectives - To analyse the biochemical, clinical and radiological parameters which correlate with the presence of esophageal varices on upper GI endoscopy in patients with chronic liver disease.

Materials and methods – This observational study included 293 patients with chronic liver disease and the laboratory and radiological variables were compared between patients with varices and non varices.

Results – In this study male patients contributed a much higher proportion in both groups with alcohol being the commonest cause for cirrhosis, among 147 patients with esophageal varices, grade III varices was noted in 44% and 86% with varices had ascites. Patients in varices group had a lower mean platelet count, higher mean bilirubin levels, higher mean spleen diameter and higher mean portal vein diameter. The ratio of platelet count by spleen diameter showed a significantly lower value in patients with varices. 67% of patients with varices had a platelet count /spleen diameter ratio < 1000 and 50% of the patients with platelet count/ spleen diameter ratio < 1000 had grade III varices. The mean portal diameter was significantly higher in patients with varices (13.18 mm) compared with non variceal group (12.37 mm). Analysis between Child Pugh score and grade of varices revealed a significantly higher proportion of patients with Child Pugh score C having grade III varices. A higher proportion of patients with varices (68 out of 147 patients) had Model for End Stage Liver Disease (MELD) score between 12 -18. 34.7% of patients with varices had Aspartate transaminase to platelet ratio index (APRI) > 1.5.

Conclusion – Non invasive parameters are very useful in predicting the presence of esophageal varices in cirrhotic patients and more studies in this realm must be undertaken in the future to reduce the burden of invasive endoscopic procedures.

KEYWORDS : Chronic liver disease, splenic vein diameter, platelet count/spleen diameter ratio, esophageal varices.

Introduction –

Cirrhosis is defined anatomically as a diffuse process characterized by fibrosis and nodule formation. (1) Cirrhosis, the end stage of any chronic liver disease of any etiology can result in portal hypertension. Portal hypertension leads to the formation of porto-sytemic collaterals including gastroeophageal varices. Esophageal varices is one of the major and lethal complications and consequences of portal hypertension. (2) They are the most clinically significant porto-systemic collaterals, as their rupture can cause lethal bleeding. Its prevalence varies from 50-60% in patients with cirrhosis of liver. (3) After varices have developed, about one-third of patients die of bleeding gastroesophageal varices. (4) The progression from small to large varices occurs in 20% of patients after one year. (5) The risk of initial bleeding from varices is 20 – 30% within 2 years, with initial bleeding episode usually occurring within one year after detection of varices. (6) The cumulative data indicate that over 70% of patients experience recurrent variceal hemorrhage within one year of their index bleeding. (7) Hence early suspicion & screening for presence of varices is the mainstay in the management of portal hypertension. Esophageal – gastroduodenoscopy is the gold standard for the detection of oesophageal varices. Earlier guidelines recommended screening endoscopy at diagnosis of cirrhosis. However, endoscopy is an invasive procedure and secondly the cost effectiveness of this approach is also questionable. (8) Thus, identification of non – invasive predictors of oesophageal varices will enable us to carry out upper GI endoscopy in selected groups of patients, thus avoiding unnecessary intervention and at the same time not missing the patient at risk of bleeding.

Materials & methods –

This observational study was conducted at Sri Ramachandra medical college & hospital, a tertiary care hospital located at Chennai from October 2013 to august 2015. The study included 293 patients with chronic liver disease, fulfilling the inclusion & exclusion criteria. All patients underwent basic laboratory tests which included complete blood count, renal & liver function tests, coagulation profile, serum electrolytes, viral markers, specific tests like antinuclear antibody (ANA), anti-smooth muscle antibody (ASMA), liver - kidney microsomal type 1antibody (LKM -1), serum ceruloplasmin & urinary copper, were done as part of evaluation of etiology in selected patients.

All patients underwent Ultrasonography using B mode with 2D curvillinear probe. Radiological data comprising of liver & spleen size, diameter of Portal vein and Splenic vein and presence of free fluid was obtained. Upper gastrointestinal endoscopy using Olympus endoscope was performed to look for the presence of Esophageal varices and thereby grade them from grades I - IV.

The laboratory and radiological data were compared between patients with varices and non varices. Child – Turcotte Pugh (CTP) score, Model for end stage liver disease (MELD) score and Aspartate transaminase to platelet ratio index (APRI) were calculated and analysed.

Selection of cases:

Inclusion criteria -

Age > 18 years

Patients diagnosed as having Chronic liver disease of any etiology.

Exclusion criteria -

Patients with active upper gastrointestinal bleeding.

Patients who have been previously diagnosed with esophageal varices by endoscopy.

Patients who have undergone endoscopic or surgical intervention for management of esophageal varices.

Stastical analysis -

The collected data of 293 patients was statistically analysed with SPSS for Windows – version 16.0. Data obtained by laboratory and radiological testing were studied and were analysed if they had a direct correlation with the presence of esophageal varices. Mean values of variables were compared between patients who had, and did not have varices. To describe about the data, descriptive statistics, frequency analysis and percentage analysis were used for categorical variables and the mean and standard deviation were used for continuous variables. To find the significant difference between the bivariate samples in independent groups (varices & non varices), unpaired sample t – test was used. To find the significance in categorical data, Chi-square test was used. In both the above statistical tools the probability (p) value of 0.05 was considered as significant level.

Results

The study included 293 patients with chronic liver disease. They were divided into varices group and non varices group. In this study male patients contributed a much higher proportion in both groups with 128 patients (87.1%) and 116 patients (79.5%) of the study population in the varices and non varices group. The study population had a greater proportion of patients between ages 41 – 50 and 51 – 60 years among both the varices and non varices group. 56 patients (38.1%) in the varices group and 43 patients (29.5%) in the non varices group were between 41 – 50 years and 39 patients (26.5%) in the varices group and 53 patients (36.3%) in the non varices group were between 51 – 60 years. Alcohol was the commonest cause for cirrhosis, accounting for 82 patients (55.8%) and 92 patients (63%) in the varices and non varices group respectively followed by Hepatits B infection seen in 23 patients (15.6%) and 19 patients (13%) in the varices and non varices group. Hepatits C was observed in 12 patients (8.1%) in the varices group and 10 patients (6.9%) in the non varices group. Non Alcoholic Steatohepatitis (NASH), cryptogenic cirrhosis, Wilsons disease, autoimmune hepatitis was also identified as etiology. Among the 147 patients with esophageal varices on endoscopy, grade III varices constituted the highest proportion with 44%. 30% of patients had grade II, 21% of patients had grade I varices and 5% had grade IV varices. 127 patients (86.4%) out of 147 patients with varices had ascites. On the other hand, 101 (69.2%) patients out of 146 patients without varices did not have coexisting ascites (p value of 0.001) (signigicant). Out of 127 patients with ascites in the varices group, 56 patients (44.1%) had grade III varices, 40 patients (31.5%) had grade II varices, 23 patients (18.1%) had grade I varices and 8 patients (6.3%) had grade IV varices.

There was statistically significant difference in the mean values of certain parameters between varices and non varices group. Patients in the varices group had a lower mean haemoglobin level (9.82) compared to the non varices group (11.06). p value of 0.001 (significant). Patients in the varices group had a lower mean platelet count (1.38 lakh) compared to the non varices group (1.61 lakh). p value of 0.001 (significant). Patients in the varices group had a higher mean bilirubin level (4.39) compared to the non varices group (3.50). p value of 0.001 (significant).

Patients in the varices group had a higher mean spleen diameter compared to the non varices group (14.13cm vs 13.2cm) and patients in the varices group had a higher mean portal vein diameter compared to the non varices group (13.18mm vs 12.37 mm). p value of 0.001 (significant). The varices and non varices group had almost similar mean splenic vein diameter (10.10mm vs 10.07mm) and also had similar mean liver diameter (12.63cm in the varices group and 12.84cm in the non varices group).

Table 1 – Relationship between CTP score and varices grade

CTP SCORE		A	B	C	TOTAL
VARICES GRADE	I	11	14	6	31
		(7.5%)	(9.5%)	(4.1%)	(21.1%)
	II	5	24	15	44
		(3.4%)	(16.3%)	(10.2%)	(29.9%)
	III	6	25	33	64
		(4.1%)	(17.0%)	(22.4%)	(43.5%)
	IV	0	1	7	8
		(0.0%)	(0.7%)	(4.8%)	(5.4%)
TOTAL	22	64	61	147	
	(14.3%)	(43.5%)	(41.5%)	(100.0%)	

Analysis between Child Pugh (CTP) score and grade of varices revealed a significantly higher proportion of patients with Child Pugh class C having grade III or IV varices. Patients with Child Pugh class A had higher probability of having grade I or II varices. Most patients with grade IV varices (7 of 8 patients) had a Child Pugh class C. p value of 0.001 (significant). (Table 1)

Table 2 – Relationship between MELD score and grade of varices

VARICES GRADE	MELD SCORE					TOTAL
	< 12	12 - 18	19 - 24	25 - 30	> 30	
I	6	18	4	1	2	31
	(18.8%)	(26.5%)	(16.0%)	(7.7%)	(22.2%)	(21.1%)
II	12	18	7	4	3	44
	(37.5%)	(26.5%)	(28.0%)	(30.8%)	(33.3%)	(29.9%)
III	12	29	14	6	3	64
	(37.5%)	(42.6%)	(56.0%)	(46.2%)	(33.3%)	(43.5%)
IV	2	3	0	2	1	8
	(6.3%)	(4.4%)	(0.0%)	(15.4%)	(11.1%)	(5.4%)
Total	32	68	25	13	9	147
	(100.0%)	(100.0%)	(100.0%)	(100.0%)	(100.0%)	(100.0%)

The association between Model for End stage Liver Disease (MELD) score and presence of varices was studied. A high proportion of the patients with varices (68 out of 147 patients) had MELD score between 12 –18. p value of 0.684. (Table 2).

Table 3 – Association between APRI and presence of varices

APRI	VARICES	NON VARICES	TOTAL
< .8	41	48	89
	(27.9%)	(32.9%)	(30.4%)
0.8 - 1.5	55	63	118
	(37.4%)	(43.2%)	(40.3%)
> 1.5	51	35	86
	(34.7%)	(24.0%)	(29.4%)
TOTAL	147	146	293
	(100.0%)	(100.0%)	(100.0%)

Aspartate transaminase to platelet ratio index (APRI) was classified into <0.8, 0.8 – 1.5, >1.5 and assessed in both groups. There was a greater number of patients with varices having an APRI >1.5, whereas there was slightly higher proportion of non varices patients with a APRI <1.5. p value of 0.541. (Table 3)

It was observed that 103 patients with varices and 67 patients without varices had thrombocytopenia. Patients without varices had a higher platelet with 54% having counts higher than 1.5 lakh. p value of 0.001 (significant). Patients with varices had a lower mean platelet count comparing to those without varices (1.38 lakh vs 1.61 lakh).

Table 4 – Relationship between platelet count and grade of varices

VARICES GRADE	PLATELET COUNT (LAKHS)				TOTAL
	< .5	.5 - 1	1 - 1.5	> 1.5	
I	1	0	18	12	31
	(25.0%)	(0.0%)	(22.2%)	(27.3%)	(21.1%)
II	1	5	22	16	44
	(25.0%)	(27.8%)	(27.2%)	(36.4%)	(29.9%)
III	2	12	37	13	64
	(50.0%)	(66.7%)	(45.7%)	(29.5%)	(43.5%)
IV	0	1	4	3	8
	(0.0%)	(5.6%)	(4.9%)	(6.8%)	(5.4%)
	4	18	81	44	147
TOTAL	(100.0%)	(100.0%)	(100.0%)	(100.0%)	(100.0%)

Patients with all grades (I to IV) of varices had an increased association with platelet count of 1 – 1.5 lakh. p value of 0.329. (Table 4)

The ratio of platelet count by spleen diameter (mm) showed a significantly lower value in patients with varices. The mean value was 983 in patients with varices, compared to a value of 1220 in the non varices group. p value of 0.001 (significant). Platelet count/Spleen diameter ratio of < 1000 and > 1000 was studied in both the groups. Two thirds (66.7%) of patients with varices had a ratio < 1000, whereas in the non varices group a majority (93%) had ratio > 1000. p value of 0.001 (significant).

Table 5 – Relationship between platelet count/spleen diameter ratio and grade of varices

VARICES GRADE	PLATELET / SPLEEN RATIO		TOTAL
	< 1000	> 1000	
I	14	17	31
	(14.3%)	(34.7%)	(21.1%)
II	30	14	44
	(30.6%)	(28.6%)	(29.9%)
III	49	15	64
	(50.0%)	(30.6%)	(43.5%)
IV	5	3	8
	(5.1%)	(6.1%)	(5.4%)
TOTAL	98	49	147
	(100.0%)	(100.0%)	(100.0%)

Significantly more number of patients with higher grade of varices had a platelet count/Spleen diameter ratio <1000, whereas in patients with grade I varices the proportion of patients in both groups were almost equal. p value of 0.025 (significant). (Table 5)

The mean portal vein diameter was significantly higher in patients with varices (13.18 mm) compared with non variceal group (12.37 mm). 76.8 % of patients had a portal vein diameter between 11 – 13 mm and 19.8 % of patients had between 13 – 15 mm. p value of 0.001 (significant).

Table 6 – Association between portal vein diameter and grade of varices

VARICES GRADE	PORTAL VEIN DIAMETER (mm)				TOTAL
	< 11	11 - 13	13 - 15	> 15	
I	0	23	7	1	31
	(0.0%)	(24.2%)	(16.3%)	(12.5%)	(21.1%)
II	0	29	12	3	44
	(0.0%)	(30.5%)	(27.9%)	(37.5%)	(29.9%)
III	1	39	20	4	64
	(100.0%)	(41.1%)	(46.5%)	(50.0%)	(43.5%)
IV	0	4	4	0	8
	(0.0%)	(4.2%)	(9.3%)	(0.0%)	(5.4%)
TOTAL	1	95	43	8	147
	(100.0%)	(100.0%)	(100.0%)	(100.0%)	(100.0%)

There was increased proportion of patients with all grades of varices having a portal vein diameter between 11 – 13mm (64%) and 13 – 15 mm (29%). p value of 0.844. (Table 6).

The mean splenic vein diameter was 13.18 mm in patients with varices compared to 12.37 mm in non varices group. A great majority of patients with varices had Splenic vein diameter between 9 – 10 mm (58.5%) and 11 – 12 mm (32%).There was no direct correlation between splenic vein diameter and presence of varices.

Patients with varices had a higher mean spleen diameter compared with non varices group (14.13 mm vs 13.25 mm). There was also significantly higher proportion of patients with varices with a spleen size of 12 – 14 mm (40.8%) and > 16 mm (44.9%).

Discussion

Platelet count and esophageal varices:

Abnormalities in platelet count and function are common in patients with all forms of liver disease. In patients with chronic liver disease and portal hypertension, a low platelet count is due in part due to hypersplenism and to low thrombopoietin levels, the key regulator of platelet function produced mainly by the liver. Platelet function, in particular aggregation, is impaired in patients with cirrhosis, particularly Child grade C, due to an intrinsic defect and circulating serum factors. Decreased production of platelets from the bone marrow follows alcohol excess, folic acid deficiency and viral hepatitis. In this study, patients with varices had a lower mean platelet count compared with those without varices (1.38 lakh vs 1.61lakh). Most of the patients with varices had thrombocytopenia (103 of 147 patients).

Several studies have assessed the role of the platelet count in predicting esophageal varices. According to Pilette et al (1999) (9) in patients with cirrhosis, the diagnostic accuracy of platelet count (<1,60,000) for large varices provided a sensitivity of 80% and a specificity of 58% and a platelet count of ≥ 2,60,000 has a negative predictive value of ≥ 91%. According to Schepis et al (2001) (10) a platelet count less than 10 x 109/L was found to be having a role in predicting esophageal varices. Platelet count < 68000/cubic mm had a specificity of 73% in predicting esophageal varices as reported by Madhotra et al. (2002) (11) Zaman et al (1999) found that a platelet count of 90 x 103 µL or less had a role in predicting varices. (12) Gil et al (13) reported that the cut off for platelet for discriminating varices from non varices was < 1.4 lakhs.

Ascites and esophageal varices :

In this study, a significant proportion of patients (86%) with varices also had ascites. On the other hand, 69% of patients without varices did not have coexisting ascites. This study also revealed a majority of patients with ascites having grade II and grade III varices (31% and 44% respectively).

Thomopolos et al (2033) (14) found out that ascites along with two other parameters (thrombocytopenia and splenomegaly) was an independent predictor of large esophageal varices in patients with cirrhosis. Masjedizadeh AR et al (15) studied non invasive predictors of oesophageal varices and found a significant correlation between ascites and presence of oesophageal varices. Dittrich et al (2001) (16) found that there was a significant correlation between the serum – ascites albumin gradient and the hepatic venous pressure gradient (HPVG), indicating the reliability of the serum – ascites – albumin gradient in demonstrating the presence of portal hypertension and its relationship with large varices.

Bilirubin and esophageal varices :

In this study, the patients in the varices group had a higher mean bilirubin level compared to the non varices group (4.39 vs 3.50). In a study by Treeprasertsuk S et al (17), a higher total bilirubin at 2 years were significantly associated with the presence of new varices. A total bilirubin level of 1.7 mg/dL was the best cut off value for the detection of new varices. A study by Arulprakash Sarangapani et al (18) showed that chronic liver disease patients with varices had a higher mean bilirubin level compared to those without varices (3.1 mg/dl vs 2.2 mg/dl; p value of 0.04), substantiating our findings.

Spleen size and oesophageal varices :

This study showed a larger mean spleen size in patients with oesophageal varices (14.13 mm vs 13.25 mm). There was also significantly higher proportion of patients with varices with a spleen size of 12 – 14 mm (48%) and > 16 mm (38%). In a study by Nemichandra et al (19), a spleen size > 11.57 cm was an independent predictor of the presence of oesophageal varices in cirrhotic patients. According to study by Chalasani et al (1999) (20) splenomegaly and low platelet count were independent predictors of large oesophageal varices. On the basis of these variables, cirrhotics were stratified into high risk groups for the presence of large oesophageal varices. Patients with platelet count of ≥ 88,000/cu mm and no splenomegaly by physical examination had a risk of large oesophageal varices of 7.2%, whereas those with splenomegaly or platelet count < 88,000/ cu mm had a risk of large oesophageal varices of 28%. Accordingly to Sanjay Kumar et al (2006) (21), presence of palpable spleen and low platelet count were independent predictors of presence of large oesophageal varices in patients with cirrhosis. Torres et al (1996) demonstrated that spleen size studied by longitudinal diameter of the spleen discriminate patients with portal hypertension with a high positive predictive value (94.4%), although it didn't happen with transverse diameter of the spleen. (22) According to Arulprakash Sarangapani et al (18), a spleen diameter of > 13.8 mm was predictive of the presence of large oesophageal varices.

Portal vein diameter and oesophageal varices :

In this study, the mean portal vein diameter was significantly higher in patients with varices (13.18 mm) compared with non varices group (12.37 mm). A large proportion of patients had a portal vein diameter between 11 – 13 mm (77%) and 13 – 15 mm (20%). There was increased proportion of patients with all grades of varices having a portal vein diameter between 11 – 13 mm (64%) and 13 – 15 mm (29%).

In a study by Sudha Rani KVL et al (23) there was significant difference in portal vein diameter between varices and non varices patients (13.09 cm vs 11.10 cm). Lopamudra Mundal et al (24) observed that the average portal vein diameter of patients without

oesophageal varices was 11.545 ± 1.514 mm and of patients with varices was 13.9998 ±1.123 mm. The difference was statistically significant ($p < 0.05$). A study by Ehab H Nashaat et al (25) compared portal vein diameter between patients with and without varices and found those with varices had a higher mean portal vein diameter (15.3 mm vs 13.8 mm). Sarwar et al (26) found that portal vein diameter > 13 mm and > 11 mm respectively were more significant for the presence of oesophageal varices.

CTP score and oesophageal varices :

In our study, analysis between Child Pugh (CTP) score and grade of varices revealed a significantly higher proportion of patients with Child Pugh class C having grade III or IV varices. Patients with Child's A had higher probability of having grade I or II varices. Most patients with grade IV varices (7 out of 8 patients) had a Child Pugh class C.

In a study by Ehab H. Nashaat et al (25) and Sumon SM et al (27), a statistically significant positive correlation was found between grade of oesophageal varices and Child Pugh's classification grades i.e, the higher grade of varices, the most advanced grade of Child's classification. A study by Ghulum Mohamad Gulzar et al (28), compared the relationship between Hepatic venous pressure gradient and Child Pugh class and found that higher Child scores were associated with higher HVPG and larger varices.

MELD score and Oesophageal varices :

In this study, the association between Model for End stage Liver Disease (MELD) score and presence of varices was analysed. A high proportion of the patients with varices (68 out of 147 patients) had MELD score between 12 –18. In a study by Benedeto – Stojanov D et al (29), the MELD score was significantly higher in the group of patients who died due to esophageal variceal bleeding ($p< 0.0001$). Engy Yousry Elsayed et al (30) studied the association of MELD score with large varice and its impact on patient mortality. Patients who died in hospital had significantly higher MELD score a as well as Child score compared to the survivors. A MELD score ≥ 12 and Child score ≥6 were associated with re-bleeding, with MELD score ≥ 17 and Child score ≥9 were associated with mortality. A study by Tafarel JR et al (31) found that MELD score higher than 8 had the highest discriminative value for presence of EV (senstivity = 80.1 %; specificity = 51.2%)

Platelet count/spleen diameter ratio and oesophageal varices

In our study, the mean value of PC/SD ratio was 983 in patients with varices, compared to a value of 1220 in the non varices group. Two third (67%) of patients with varices had a ratio < 1000, whereas in the non varices group a majority (93%) had ratio 1000. Significantly more number of patients with higher grade of varices had a PC/SD ratio <1000, whereas in patients with grade I varices the proportion of patients in both groups were almost equal. Gianni et al (2003) (32) stated that platelet count/spleen diameter ratio can be used as a non invasive marker for predicting oesophageal varices in patients with liver cirrhosis. A platelet count/spleen diameter ratio cut off value of 909 had 100% negative predictive value for a diagnosis of oesophageal varices. Waqas Wahid Baig et al (33) found that platelet count to spleen diameter ratio in patients with EVs were significantly different from patients without EVs. The platelet count to spleen diameter ratio had the highest accuracy among other non invasive parameters and a platelet count to spleen diameter ratio cut-off value of 1014 gave positive and negative predictive values of 95.4% and 95.1 % respectively. In a study by Mona A. Abu El Makarem (34), the platelet count/spleen diameter ratio in patients with EVs was significantly lower than in patients without EVs. In an analysis of the receiver operating characteristics curves (ROCs), we calculated an optimal cutoff value of 939.7 for this ratio, which gave 100% sensitivity and negative predictive values, 86.3% specificity, a 95.6% positive predictive value. Studies by Thabut D et al (35), Grace Marie et al (36), Jayesh Sharma et al (37) have confirmed the predictive value of platelet count/spleen diameter ratio in diagnosing the presence of oesophageal varices.

Splenic vein diameter and oesophageal varices :

In this study, the mean splenic vein diameter was 13.18 mm in patients with varices compared to 12.37 mm in non varices group. A great majority of patients with varices had splenic vein diameter between 9 – 10 mm (57%) and 11 – 12 mm (35%). According to Arulprakash Sarangapani et al (18), patients with oesophageal varices had a higher mean splenic diameter (9.2mm) compared to those without varices (7.8 mm). According to Montasser MF et al (38), a combination of splenic vein diameter > 8.9 mm + portal vein diameter > 13 mm + ammonia level > 133 µg/dL, gives 100% of sensitivity and 96% of specificity for the prediction of the presence of portosystemic shunts.

APRI and oesophageal varices :

In this study, Asparate transaminase to platelet ratio index (APRI) was classified into < 0.8, 0.8 – 1.5, >1.5 and assessed in both groups. There were a greater number of patients with varices having an APRI > 1.5, whereas there was slightly higher proportion of non varices patients with a APRI < 1.5. Wai CT et al formulated the equation as follows:

Aspartate aminotransferace (AST)/upper normal limit x 100 platelet counts (109/L). In this study, APRI score value of < 0.5 indicated no or minimal fibrosis, APRI score from 0.5 to 1.5 indicated significant fibrosis and APRI score > 1.5 indicated liver cirrhosis. (39) Tafarel JR et al (31) in his study concluded that APRI higher than 1.64 ($p=0.010$ along with a platelet count lower than 93,000/mm³ and MELD score than 8 were independent predictors of oesophageal varices. Zambam de Mattos et al (40) demonstrated that APRI had a sensitivity of 64.7%, specificity of 72.7%, positive predictive value of 86.5% and a negative predictive value of 43.2% for the detection of oesophageal varices.

Conclusion

In this study it was observed that the laboratory parameters which were predictive of oesophageal varices were a lower haemoglobin level, lower platelet count and higher bilirubin level, radiological indices like larger spleen and portal vein diameter and presence of ascites. The ratio of platelet count by spleen diameter (mm) showed a significantly lower value in patients with varices. Child Pugh score and presence of ascites were indirect predictors of large varices. Thus, non invasive parameters are useful in predicting the presence of oesophageal varices in cirrhotic patients and more studies in this realm must be undertaken in the future to reduce the burden of invasive endoscopic procedures.

References

1. Sherlock Shiela, Diseases of the Liver and Biliary system 11E,21:365
2. De Franchis R, Primignani M. Natural historyof portal hypertension in patients with cirrhosis. Clin. Liver Disease 2001; 5: 645 -63.
3. Luketic VA, Sanyal AJ. Oesophagealvarices. clinical presentation, medical therapy and endoscopic therapy. Gastroenterology clinics of North America 2000: 29: 337-385.
4. Rigo GP, Merghi A, Chalen NJ, Mastronardi M, Codoluppi PL, Ferrari A et al. A prospective study of the ability of the three endoscopic classification to predict hemorrhage from oesophagealvarices. Gastro intestEndos. 1992; 38: 425-9.
5. Bhathal PS, Grossman HJ. Reduction of the increased portal vascular resistance of the isolated perfused cirrhotic rat liver by vasodilators. J Hepatol 1985; 1: 325–337.
6. The Northern Italian Endoscopic club for the study and treatment of esophageal varices. Prediction of the first variceal hemorrhage in patients w ith cirrhosis of the liver and esophageal varices: a prospective multi center study. N. Engl. J. Med. 1988; 319: 983 -9.
7. Graham DY Smith JL. The Course of patients after variceal hemorrhage. Gastroenterology 1981; 80:800
8. Martin IV, Borkham -Kamphorst E, Zok S, van Roeyen CR, Eriksson U, Boor P, Hittatiya K, Fischer HP, Wasmuth HE, Weiskirchen R, et al. Platelet -derived growth factor (PDGF) -C neutralization reveals differential roles of PDGF receptors in liver and kidney fibrosis. Am J Pathol. 2013; 182:107 –117
9. Pilette C, Oberti F, Aubé C, et al. (1999) Non -invasive diagnosis of esophageal varices in chronic liver disease. Journal Of Hepatology, 31:867 –73.
10. Schepis F, Cammà C, Niceforo D, et al.(2001) Which patients should undergo endoscopic screening for esophageal varices detection ? Hepatology, 33:333 –8.
11. Madhotra R, Mulcahy HE, Willner I, et al. (2002) Prediction of esophageal varices in patients with cirrhosis, Journal of Clinical Gastroenterology, 34:81 – 5
12. Zaman A, Hapke R, Flora K, et al. (1999) Factors predicting the presence of esophageal varices or gastric varices in patients with advanced liver disease. American Journal of Gastroenterology, 94;3292 - 6
13. Gil ML, Atiq M, Sattar S, Khokhar N. Non endoscopic parameters for the identification of esophageal varices in patients with chronic hepatitis. J Pak Med Assoc. 2004 Nov; 54 (11): 575 - 7
14. Thomopoulos K C, Labropoulou -KaratzaC, Mimidis K P, Katsakoulis E C, Iconomou G, Nikolopoulou V N.(2003)Non invasive predictors of the presence of large esophageal varices in patients with cirrhosis. Digestive and liver disease, 35 (7):473-78.
15. Efficacy of Platelet/Spleen Diameter Ratio for Detection of Esophageal Varices in Cirrhotic Patients. MasjedizadehAR,Journal of Gastroenterology and Hepatology Research 2013; 2(5): 590 -592
16. Dittrich S, Yordi LM, de Mattos AA.(2001) The value of serum-ascites albumin gradient for the determination of portal hypertension in the diagnosis of ascites. Hepatogastroenterology, 48(37):166 -8.
17. Treeprasertsuk S et al., The predictors of the presence of varices in patients with primary sclerosing cholangitis ; Hepatology. 2010 Apr; 51(4):1302 -10. doi: 10.1002/hep .23432.
18. Arulprakash Sarangapani et al; Noninvasive Prediction of Large Esophageal Varices in Chronic Liver Disease Patients. Saudi J Gastroenterol. 2010 Jan-Mar; 16(1): 38 –42
19. Nemichandra et al; Non Endoscopic Predictors of Esophageal Varices in Patients with Cirrhosis of Liver; IOSR Journal of Dental and Medical Sciences (IOSR-JDMS) e-ISSN: 2279 -0853, p-ISSN: 2279 - 0861.Volume 14, Issue 1 Ver. II (Jan. 2015)
20. Chalasani N, ImperialeTF, Ismail A et al. (1999) Predictors of large esophageal varices in patien ts with cirrhosis. American Journal Of Gastroenterology, 94:328591
21. Sanjay Kumar Sharma and Rakesh Aggarwal. (2006) Prediction of large esophageal varices in patients with cirrhosis of the liver using clinical, laboratory and imaging parameters, Journal of Gastroenterology and Hepatology, Online Early Issue.
22. Torres E, Calme F, Herrera B. (1996) Echographic parameters in the evaluation of the degree of portal hypertension. Review of Gastroenterology Peru, 16(2):125-32.
23. Correlation of portal vein size with esophageal varices severity in patients with cirrhosis of liver with portal hypertension. Dr K.V.L. Sudha Rani; International Journal of

Scientific and Research Publications, Volume 5, Issue 1, January 2015
24. Correlation of portal vein diameter and splenic size with gastro-oesophageal varices in cirrhosis of liver Lopamudra Mandal. JIACM 2011; 12 (4): 266-70
25. Ehab H. Nashaat et al; Non -Endoscopic Predictors of Esophageal Varices and Portal Hypertensive Gastropathy.,[Nature and Science 2010;8(6):43 -50]
26. Shahid Sarwar et al; Non endoscopic prediction of presence of Esophageal Varices (JCPSP 2005 Vol. 15).
27. Sumon SM, Sutradhar SR, Chowdhury M, Khan NA, Uddin MZ, Hasan MI, Rozana FK, Haque MF, Barmman TK, Ferdous J; Relation of different grades of esophageal varices with Child-Pugh classes in cirrhosis of liver; Mymensingh Med J. 2013 Jan ; 22(1): 37-41.
28. Ghulam Mohamad Gulzar et al; Correlation of hepatic venous pressure gradient with variceal bleeding, size of esophageal varices, etiology, ascites and degree of liver dysfunction in cirrhosis of liver ;Indian J Gastroenterol 2009(March –April):28(2):59 –61
29. Benedeto-Stojanov D et al; The model for the end-stage liver disease and Child -Pugh score in predicting prognosis in patients with liver cirrhosis and esophageal varicealbleeding. Vojnosanit Pregl. 2009 Sep;66(9):724-8.
30. Engy Yousry Elsayed, George Sfwat Riad, Marcel William Keddeas; Prognostic value of MELD score in acute varicealbleeding;Researcher 2010; 2(4):22 -27
31. Tafarel JR et al; Prediction of esophageal varices in hepatic cirrhosis by noninvasive markers. Eur J GastroenterolHepatol. 2011 Sep; 23(9):754 -8
32. Giannini E, Botta F, Borro P, RissoD,Romagnoli P, Fasoli A, Mele M R,Testa E, Mansi C, Savarino V, Testa R.(2003)Platelet count/spleen diameter ratio: proposal and validation of a non -invasive parameter to predict the presence of esophageal varices in patients with liver cirrhosis.Gut,52:1200 -1205.
33. Waqas, Wahid Baig, Platelet count to spleen diameter ratio for the diagnosis of esophageal varices: Is it feasible ? Can J Gastroenterol. 2008 Oct; 22(1): 825 – 828
34. Mona A. Abu El Makarem et al; Platelet count/ bipolar spleen diameter ratio for the prediction of esophageal varices . Hepat Mon. 2011 Apr 1; 11(4): 278–284
35. D Thabut et al; Prediction of esophageal varices with platelet count/spleen diameter ratio or platelets alone Gut. 2004 Jun; 53(6): 913–915.
36. Grace Marie A Legasto, Judy Sevilla, Angelito Balay, Jose A Tan, Lirio V Cham, Arnold Vitug, Armando Sta Ana; Platelet Count/Spleen Diameter Ratio: A Non Invasive Parameter To Predict The Presence Of Esophageal Varices; Phil J GASTROENTERO L 2006; 2: 33-38
37. Jayesh Sharma et al ; A Study Of Role Of Platelet Count/Spleen Diameter Ratio As A Predictor Of Esophageal Varices In Patient With Chronic Liver Disease; National Journal Of Medical Research Volume 4 | Issue 3 | July – Sept 2014., 232 -234
38. Mohamed F. Montasser, Heba M. Abdella, Amir HelmySamy; Evaluation of Venous Ammonia Level, Splenic Longitudinal Diameter, Portal Vein and Splenic Vein Diameters as Non -Invasive Indicators for the Presence of Portosystemic Collaterals in Egyptian Cirrhotic Patients; Open Journal of Gastroenterology, Vol.4 No.6, 2014
39. Wai CT, Greenson JK, Fontana RJ, Marreroja, Conjeevaram HS. A simple non invasive index can predict both significant fibrosis and cirrhosis in patients with chronic hepatitis C. Hepatology 2003; 38:518-26.
40. Zambam de Mattos A 1 , Alves de Mattos A, Daros LF, Musskopf MI; Aspartate aminotransferase -to-platelet ratio index (APRI) for the non -invasive prediction of esophageal varices; Ann Hepatol. 2013 Sep-Oct; 12(5):810 -4