Platelet Count/Spleen Diameter Ratio; is it Valid Marker for Large Esophageal Varices in Chronic Liver Disease

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Abstract

Portal hypertension is the most common and lethal complication of chronic liver disease. It is directly related to morbidity and mortality in chronic liver disease patients. Bleeding from ruptured gastro-esophageal varices is a major complication of portal hypertension and a frequent cause of death. Early diagnosis and prevention of gastro-esophageal variceal bleed by medical and endoscopic intervention is the main stay in the long term management of chronic liver disease patients.

Upper GI endoscopy is a gold standard and will remain the gold standard for diagnosis of gastro-esophageal varies. Screening of every patient at the time of diagnosis of liver cirrhosis was the main consensus. However, subjecting all the patient to screening endoscopy may not be justified due to socio economic constraints. So, to reduce unnecessary endoscopy, its cost and burden, several studies have evaluated possible noninvasive markers of gastro-esophageal varies in cirrhosis, which should be less expensive, non-invasive, accurate and reproducible. Most of these studies used parameters such as splenomegaly, thrombocytopenia, Childs score, ascites, portal flow patterns, and platelet count-splenic size ratio to predict the esophageal varices. Out of all these the platelet count/spleen diameter ratio of 909 or less is the only parameter which is independently associated with the presence of large esophageal varices, and its negative predictive value is reproducible.

Keyword — *noninvasive marker, esophageal varices, chronic liver disease.*

I. INTRODUCTION

Portal hypertension is the most common and lethal complication of chronic liver disease. It is directly related to morbidity and mortality in chronic liver disease patients. It is responsible for development of gastro-esophageal varices, varical haemorrhage, ascitis, renal failure, porto-systemic encepahalopathy, hyper splenism and hepato-pulmonary syndrome. Bleeding from ruptured gastro-esophageal varices is a major complication of portal hypertension and a frequent cause of death. Esophageal varices are present in approximately 40% of patients with newly detected cirrhosis and in as many as 60% of patient's cirrhosis with ascities[1]. In cirrhotic patients who do not have esophageal varices at initial endoscopy, new varices will develop at a rate of approximately 5%[2]. In patients with small varices at initial endoscopy, progression to large varices occurs at a rate of 10% to 15% per year and is related predominantly to the degree of liver dysfunction[3]. Variceal hemorrhage is an immediate life-threatening problem and about 20–30% mortality is encountered with each episode of bleeding. Up to about 25% of patients with newly diagnosed varies will bleed within two years[3]. Variceal size is the best clinical predictor of bleeding. The risk of bleeding in patients with varices less than 5 mm in diameter is 7% by two years, and the risk in patients with varices greater than 5 mm in diameter is 30% by two years[3]. Early diagnosis and prevention of gastro-esophageal variceal bleed by medical and endoscopic intervention is the main stay in the long term management of chronic liver disease patients.

Upper GI endoscopy is a gold standard and will remain the gold standard for diagnosis of gastro-esophageal varies. Portal hypertension typically develops as a silent process in cirrhotic under CLD. Screening of every patient at the time of diagnosis of liver cirrhosis was the main consensus according to the American Association for the Study of Liver Disease (AASLD) and Baveno IV Conference. However, subjecting all the patient to screening endoscopy may not be justified due to socio economic constraints. So, to reduce unnecessary endoscopy, its cost and burden, several studies have evaluated possible noninvasive markers of gastro-esophageal varies in cirrhosis, which should be less expensive, non-invasive, accurate and reproducible. Several Investigators have attempted to identify biochemical, clinical and ultra sonographic parameters alone or together to have good predictive power for non-invasively assessing for the presence of esophageal varices[4-7]. Most of these studies used parameters such as splenomegaly, thrombocytopenia, Childs score, ascites, portal flow patterns, and platelet count-splenic size ratio to predict the esophageal varices. Out of all these the platelet count/spleen diameter ratio of 909 or less is the only parameter which is independently associated with the presence of large esophageal varices, and its negative predictive value is reproducible. Its use of value even in the subgroup

of patients with compensated disease, and it is also cost effective. However, to use such noninvasive marker in clinical practice to predict the risk of large esophageal varies it requires large multicenter trials with large number patients.

This study is carried out in the Department of Medicine, Guwahati Medical College Hospital to evaluate the platelet count/ splenic diameter ratio as a noninvasive marker to predict the presence of large esophageal varies in chronic liver disease patient.

II. MATERIALS AND METHODS

Patient of chronic liver diseases were recruited from different medical wards, gastroenterology ward and medicine OPD in Gauhati Medical College and Hospital. A total of 47 CLD patients were included in our study of both sexes and age matched more than 18 years.All patients were subjected to through scheme of case taking including detail history of presenting symptom, social history and personal history were elicited.

III. SELECTION CRITERIA

Patient with stigmata of chronic liver disease based on clinical, laboratory and radiological data were included in this study along with age group above paediatric age group (>18 years) with both the male and females patients. Patients who had previously underwent sclerotherapy, band ligation of esophageal varices, surgical intervention which alter portal haemodynamics, patients taking drugs for primary prophylaxis of variceal bleeding, patients with hepatocellular carcinoma, patients with portal, splenic or hepatic vein thrombosis and patients with severe cardiac, chest or renal disease were excluded from this study.

IV. STATISTICAL ANALYSIS

Patient's data were analyzed, using quantitative variables were expressed by mean and SD, compared using Fisher's Exact test. An ROC curve was constructed and the optimal cut off points with accuracy, sensitivity, specificity, PPV, and NPV were calculated. 'p' value was considered to be significant if less than 0.05.

V.RESULTS

The Age distribution of the cases showed that mean age of patient was 47 years. 83% of the studied patients were males. Male: female ratio was 4.8:1. Etiological diagnosis showed that ethanol was the most common etiological factor for cirrhosis in 76% patients followed by
cryptogenic in 12.76%, Hepatitis B 6.3%, Hepatitis C in 4.2%. There was no patient of autoimmune etiology.

The prevalence of esophageal varices in our patient is 93.61% and 6% of patients do not have esophageal varices, the frequency of small and large varices were 51% and 42% respectively.

The mean hemoglobin of our patient was 8.4gm%, and p value of patient with large and small esophageal varices was not significant. Similarly p value of AST, ALT, PT and INR in patients with small and large esophageal varices was not significant.

The mean value of spleen diameter in our patient was 125 mm. In patient with small and large esophageal varices the mean values were 119 mm and 132 mm respectively. The p value was not significant (table 1).

In our study the mean value of platelet count / spleen diameter ratio was 956.55, were as mean value in patient with small and large esophageal varices were 1120.4 and 735.4 respectively and p value was significant (table 1).

The mean platelet count in our study was 114 (10×3/µL), putting this value as cut off for diagnostic evaluation of large esophageal varices in our patient, the p value was significant (table 1).

The receiver operator characteristics (ROC) curve was used to evaluate platelet count, spleen diameter and platelet count / spleen diameter ratio to select the best cut off value for sensitivity and specificity to predict the presence of large esophageal varices (table 2). The area under curve is maximum for platelet count / spleen diameter ratio (0.760) at cut off value ≤903, with sensitivity of 85% and specificity of 77%. The cut off value for platelet count is <112 10×3/µL and spleen diameter is >128 mm in our study, the corresponding area under curve was 0.699 and 0.644 (figure 1, 2 and 3).

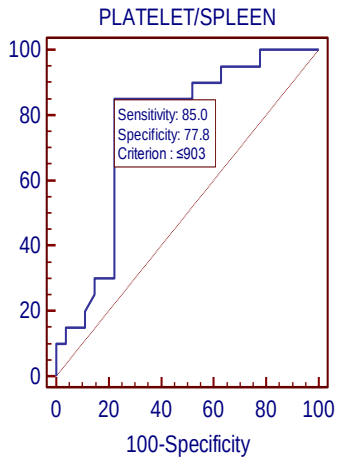

Figure 1: ROC for platelet count spleen diameter ratio.

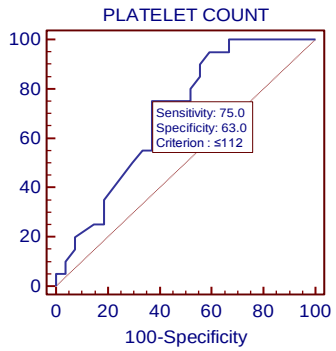

Figure 2: ROC for platelet count in our studied patients.

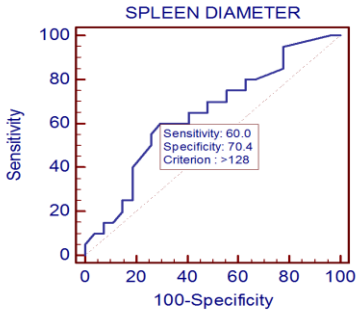

Figure 3: ROC for spleen diameter of our studied patients.

So, platelet count / spleen diameter ratio was found to be a better predictor of large esophageal vaices as compared to platelet count and spleen diameter itself.

VI. DISCUSSION

Variceal bleed is a life-threatening condition having a mortality of 20–30% with each episode of bleed. Due to the increasing prevalence of chronic liver disease in this part of the world, variceal bleed has become an important contributor to morbidity, mortality, and escalating costs in health care.

Presently upper gastrointestinal endoscopy is the most accurate screening method for esophageal varices. However, these recommendations carry an increasing burden on the health care support for endoscopy services. In this context, non-invasive methods for predicting the presence of large esophageal varices have been developed and validated by several studies, to ease the medical, social and economic burden of disease. These studies have shown independent parameters such as splenomegaly[8], ascites[9], spider naevi[8], Child's grade[10], platelet count[11,12], prothrombin time, portal vein diameter, platelet count/spleen diameter ratio[4], serum albumin[13], and serum bilirubin[9] are significant predictors for the presence of varices. The ratio of platelet count to spleen diameter is one of the most useful non-invasive predictor of the presence of esophageal varices[4,14-18].

VII. CONCLUSION

Esophageal varices causing upper G.I.bleeding is common with high morbidity and mortality in chronic liver disease patients with portal hypertension. The current consensus is to screen every patient for esophageal varices at the time of diagnosis of liver cirrhosis. However, subjecting all the patient to screening endoscopy may not be justified considering the poor socioeconomic status of our people. Several studies have evaluated possible noninvasive markers of gastroesophageal varies, which in future may minimize early endoscopic intervention as a screening procedure.

The platelet count/spleen diameter ratio of 909 or less is the only parameter which is independently associated with the presence of large esophageal varices, and its negative predictive value is reproducible. However, it is too early to say that the findings of this study can justify substitution of upper G.I. Endoscopy by platelet count/spleen diameter ratio as an alternative screening procedure for all cases of oesophageal varices.

Upper G.I. Endoscopy still remains the gold standard for detection of oesophageal varices. However, more such studies in future may help in prioritizing the patients with large oesophageal varices for early endoscopic evaluation.

Table 1: Showing results of different parameter with pre-determined cut off value. PPV (Positive predictive value), NPV (Negative predictive value).

TEST PARAMETERS	CUT OFF POINT	AREA UNDER ROC	SENSITIVITY	SPECIFICITY	STANDARD ERROR	95% CONFODENCE INTERVAL.
PLATELET COUNT	≤112	0.699	75.0	63.0	0.0761	0.548 TO 0.824
SPLEEN DIAMETER	>128	0.644	60.0	70.4	0.0828	0.490 TO 0.778
PLATELET COUNT / SPLEEN DIAMETER RATIO	≤903	0.760	85%	77.8%	0.0738	0.613 TO 0.873

Table 2: Receiver operating characteristic (roc) curves showing test variable with cut off and respective findings

PREDICTOR	CUT OFF POINT	SENSITIVITY (%)	SPECIFICITY (%)	PPV (%)	NPV (%)	POSITIVE LIKELIHOOD RATIO	NEGATIVE LIKELIHOOD RATIO	p value
PLATELET COUNT	114 (10×3/µL)	75	63	60	77	2.02	0.4	0.017
SPLEEN DIAMETER	125 mm	60	59.26	52	66.6	1.47	0.68	0.24
PLATELET COUNT/ SPLEEN DIAMETER RATIO	909	85.00	77.78	73.91	87.50	3.83	0.19	0.0001

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