Original Research Article

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Study the association between platelets count and grades of oesophageal varies in patients of cirrhosis of liver with portal hypertension

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ABSTRACT

Background: cirrhosis of liver is a diffuse process of fibrosis that converts the liver architecture into structurally abnormal nodules Portal hypertension leads to dilatation of portal vein, splenomegaly, and formation of portal systemic collaterals at different sites. Screening endoscopy is recommended for early detection of esophageal varices (EVs) in cirrhotic patients with portal hypertension. However, this approach is limited by its invasiveness and cost. The aim of the study was to determine if platelet count can predict the presence of EVs, especially large (grade III, IV) EVs in need of prophylactic therapy.

Methods: Statistically 100 patients previously or newly diagnosed with cirrhosis of liver with portal hypertension without history of hepatic encephalopathy, variceal bleeding, EVL, use of beta blockers, were selected for the study. Ultrasonography was performed in all cases to note the spleen size. Routine blood testing including platelet count was done and UGI-Endoscopy was done to detect presence of varices with grades. Statistical Analysis: Statistical analysis was done using Statistical Package for Social Survey (SPSS) for Windows version 17.0. The data obtained was analysed using mean, SD, Student's t-test and chi square correlation coefficient, p value <0.05 was considered significant.

Results: Among 100 patients studied ,90% patients were found to have esophageal varices. Based on endoscopic grading, incidence of grade 2 and grade 3 esophageal varices predominated, accounting to 48% and 23 % respectively. On correlation of platelet count with grades of esophageal varices it was evident that 44 patients had their platelet count less than 1 lac out of which 24 patients had grade 2 varices followed by 14 patients with grade 3 varices, p value <0.001 and was highly significant.

Conclusions: The study depicts that with decrease in platelets count the chances of formation of higher grades of oesophageal varices increases and also a positive association exists.

Keywords: Cirrhosis of liver, Gastro-oesophageal varices, Platelets count, Portal hypertension

INTRODUCTION

Portal hypertension is the most common complication and also one of the important causes of death in chronic liver diseases. Increased resistance to portal blood flow due to alteration of the hepatic architecture leads to dilatation of portal vein, splenomegaly, and formation of esophageal and gastric varices, variceal haemorrhage, ascites, hypersplenism, encephalopathy, etc. In cirrhosis, increased intrahepatic vascular resistance is thought to be located mainly in the hepatic sinusoids.¹ Recent studies have demonstrated that in addition to the increased resistance caused by the morphologic changes of chronic liver diseases, a dynamic component of increased resistance (resulting from the active contraction of vascular smooth muscle cells, myofibroblasts, and hepatic stellate cells) is also present.² Guidelines stress on screening endoscopy for early detection of EVs in cirrhotic patients with portal hypertension.³ However, this is a rather unpleasant method that carries a certain risk of complications.⁴

Recent research has focused on the use of non-invasive methods to detect patients with the intention of avoiding endoscopy in low-risk cases.⁵ Thrombocytopenia (platelet count <150,000/µL) is a common complication in patients of chronic liver disease (CLD).⁶ The exact pathogenesis of thrombocytopenia in patients with CLD is multifactorial and includes decreased production of thrombopoietin, splenic sequestration of platelets, and myelo-suppression of platelet production.7 So, we formulated this study to evaluate the association between platelet count and grades of esophageal varies in patients of cirrhosis of liver with portal hypertension, because presence of medium and large-sized varices are an indication for prophylactic therapy. The aim was to assess the possibility of utilizing the platelet count to spare patients at low risk for variceal bleeding from endoscopic screening.

METHODS

The prospective cross sectional study was carried out among 100 patients of cirrhosis of liver with portal hypertension attending Gastroenterology, medicine OPD and admitted in IPD, Department of Medicine, LLR & Associated Hospitals, GSVM Medical College, Kanpur during study period from January 2018 to October 2019. The study protocol was approved by the institutional ethics committee review board.

Inclusion criteria

Previously diagnosed and newly diagnosed cases of cirrhosis of liver with portal hypertension.

Exclusion criteria

- Patients suffering from hepatic encephalopathy
- Patients with previous history of portal hypertensive bleeding.
- Patients on previous or current treatment with beta blockers, diuretics or other vaso-active drugs. and
- Patients with previous history of sclerotherapy or banding for esophageal varices.

Salient features in the history included occupation, alcohol intake, appetite, jaundice, fullness of abdomen, disorientation, unconsciousness, etc.

A thorough general survey was done to assess pallor, cyanosis, jaundice, oedema engorged neck veins, palpable neck glands, pulse, and blood pressure. The gastrointestinal system was clinically examined with focus on the size of the spleen, liver span, presence of ascites, fluid thrill, palmar erythema, loss of axillary hair, presence of any venous prominence over the abdomen and gynecomastia, testicular atrophy in men. Routine blood test including -LFT, Platelet count, PT/INR; Upper GI endoscopy; USG; Other investigations like - fibroscan and liver biopsy if required were performed.

Upper gastro-intestinal Endoscopy was performed in the department of Medicine, GSVM Medical College, Kanpur in all selected cases to look for gastro-esophageal Varices and other associated signs of portal hypertension like red wale marks, cherry red spots. In patients with two different types of variceal grades, the higher variceal grade was considered for this study.

- Grade 1: Small varices without luminal prolapse.
- Grade 2: Moderate sized varices showing luminal prolapse with minimal obscuring of the gastro esophageal junction
- Grade3: Large varices showing luminal prolapse subsequently obscuring the gastro esophageal junction.
- Grade 4: Very large varices completely obscuring the gastro esophageal junction.

Statistical analysis

Statistical analysis was done using Statistical Package for Social Survey (SPSS) for Windows version 17.0. The data obtained was analysed using mean, SD, Student's ttest and chi square correlation coefficient, p value <0.05 was considered significant.

RESULTS

Majority of the patients belong to the age group of 40-49 years accounting for 35% followed by 23% in the age group of 30-39 years. Among all 85% of the patients were male while 15% of the patients were females.

Approximately 90% of the patients were found to have esophageal varices while 10% of the patients had no esophageal varices.

In 76% of the patients have portal vein diameter more than 13 mm while 24% of the patients have portal vein diameter less than or equal to 13 mm.

About 48% of the patients were found to have grade 2 varices and 23% of the patients were found to have grade 3 varices while 19% of the patients were found to have grade 1 and no varices in 10 patients.

Table 1 shows that 44% of the patients had platelets in the range of 0.5 lacs to 0.99 lacs followed by 21% of the

patients having platelets in the range of 1 lac to 1.4 lacs in all study population.

Table 1: Distribution based on platelet count.

Platelet count (Lacs)	No. of patients	Percent%
<0.50	12	12.0
0.50-0.99	44	44.0
1.0-1.4	21	21.0
1.5-2.0	16	16.0
>2.0	7	7.0
Total	100	100

Table 2 depicts that 48% of the patients were found to have grade 2 varices and 23% of the patients were found to have grade 3 varices while 19% of the patients were found to have grade 1 and no varices in 10 patients in all study groups.

Table 2: Distribution based on grade of esophageal
varices (OV).

Grade of OV	No. of patients	Percent%
Nil	10	10.0
Grade1	19	19.0
Grade2	48	48.0
Grade3	23	23.0
TOTAL	100	100.0

In Table 3 on statistical analysis following value were found: t=0.2486, p>0.05(0.8041), inference = non-significant, L.L-U.L = -9.0 to + 0.89 (LL= lower limit, UL=upper limit). These values shows that mean age of the patients having varices was 47.4 with standard deviation of 10.96 and was not found to be statistically significant.

Table 3: Mean age of the patients.

Varices	No. of patients	Mean age in years	Std. deviation
Varices present	90	47.4	10.96
No varices	10	48.3	9.79

Table 4: Mean platelet count of the patients.

Varices	No. of patients	Mean platelet count (lacs)	SD
Varices present	90	1.1	0.51
No varices	10	1.68	0.73

In Table 4 on statistical analysis following value were found: t= 3.25, p<0.001540, p<0.001, inference =highly significant. These values show that mean platelet count of the patients having varices was found to be 1.1 with standard deviation of 0.51 and it was highly significant.

Table 5: Correlation of platelet count and grades of
esophageal varices.

Platelet count (lacs)	Nil	Grade 1	Grade 2	Grade 3	Total
<.50	0	1	9	2	12
0.50-0.99	2	4	24	14	44
1.0-1.4	2	7	5	7	19
1.5-2.0	3	4	9	0	16
>2.0	3	3	1	0	7
Total	10	19	48	23	100

In the above Table 5 on statistical analysis following value were found: x2=33.58, p<0.0007851, p<0.001, inference= highly significant. From the above correlation it is evident that majority of the patients having esophageal varices have platelet count below 1 lac accounting for 44 patients, with 19 patients having between 1 to 1.4 lacs.

DISCUSSION

Severe upper gastrointestinal bleeding as a complication of portal hypertension develops in about 30-40% of the patients with cirrhosis due to increased prevalence of chronic liver disease, variceal hemorrhage is associated with significant morbidity, mortality and health care costs. Numerous studies have demonstrated the efficacy of beta blockers for primary prevention of variceal bleeding in patients with high risk varices indicating the importance of screening for the presence of esophageal varices8. Current guidelines recommend that all cirrhosis patients should undergo endoscopic screening at the time of diagnosis to identify those at high risk of bleeding and likely to benefit from primary prophylaxis. This approach, however, places a heavy burden on endoscopy units and the repeated testing over time can decrease patient compliance.9

The development of Gastro-Esophageal varices is a common complication of portal hypertension, and bleeding from it is a frequent cause of mortality and morbidity. Esophago-gastro-duodenoscopy is the standard method to diagnose the presence of esophagogastric varices and to estimate the risk of bleeding. It is recommended that all patients undergo endoscopic screening for varices at the time when cirrhosis is diagnosed.¹⁰

Spider nevi, a low albumin and low-platelet count were shown to be independent risk factors for the presence of varices in a study by Garcia-Tsao et al.¹¹

Therefore, there is a particular need for non-invasive predictors for the presence of esophageal varices to ease the medical social and economic burden of the disease. However, many previous studies have shown a good predictive value of different nonendoscopic variables for the presence or absence of gastro-Esophageal varices.¹²

Study was conducted with sample size consisting of 100 patients of whom 85 were males and 15 were females. Males contributed about 85% of the study population. Incidence of cirrhosis was maximum in the age group 40-49 years (35%). Overall mean age was 47.5 ± 10.8 . Mean age in patients with esophageal varices was 47.4 ± 10.96 as compared to 48.3 ± 9.79 in patients without esophageal varices.

However mean age was 51(range 20-80) in study by Baig et al, mean age was 42 (range 17-73) in a study by Cherian et al, and in study by Sarangapani et al, median age was 45 (range 18-74).^{8,13,14} Youngest patient in this study was 24 years and oldest was 72 years. In present study 23% were in the age group of 30-39 years, closely followed by 22% in the age group of 50-59 years. Males predominated in each of the age group studied.

Among 100 patients studied 90% patients were found to have varices Lopamudra Mandal et al, (82 patients) found that twenty patients had no varices (grade 0) and the rest sixty-two patients developed varices.¹⁵

Based on platelet count, majority of the patients belonged to 0.5 - 0.99 lacs range accounting for 44%, 77% of the study population had the platelet count less than 1.5 lacs/mm³. The mean platelet count in our study was 1.07 lacs/mm³. Among the patients with varices, mean platelet count was 1.1 ± 52 as compared to 1.68 ± 0.73 in patients without varices.

Pathogenesis of thrombocytopenia includes productive, consumptive, or distributional mechanisms. It is commonly believed to be due to pooling and destruction of platelets in the spleen which may be mediated by platelet associated IgG. Reduced levels of thrombopoietin either due to impaired production or rapid degradation may also add to thrombocytopenia. Thus, platelet count depends on multiple factors and not just portal hypertension. Garcia Tsao et al, (180 patients), Pilette et al, (116 patients) and Thomopoulos K.C et al, (184 patients) reported a low platelet count to be an independent risk factor for the presence of varices.¹⁶⁻¹⁸ Chalaseni et al, (346 patients) found that a platelet count <88,000 was an independent risk factor for the presence of large varices.¹⁹ In retrospective analysis of 143 patients with compensated cirrhosis, Schepis F et al, reported esophageal varices in 63 patients (44%) with platelet count < 1 lac as predictor of esophageal varices.²⁰ Zaman et al, reported that groups without varices had a higher mean platelet count (mean platelet count 1,28,500) than the group with small varices (mean platelet count ,1,07,800) and platelet count of <90,000 increased the risk of having esophageal varices by nearly 2.5 fold.²¹

In present study 90% patients were found to have esophageal varices. Based on endoscopic grading, incidence of grade 2 and grade 3 esophageal varices predominated, accounting to 48% and 23% respectively. However, grade 1 varices accounted for 19% and varices were absent in 10% of cases. on correlation of platelet count with grades of esophageal varices it was evident that 44 patients had their platelet count less than 1 lac out of which 24 patients had grade 2 varices followed by 14 patients with grade 3 varices, p value<0.001 and was highly significant. Grading of Esophageal varices was inversely correlated with platelet count in our study. This is in agreement with the findings of Abbasi et al, stated that the severity of thrombocytopenia increased as the grading of Esophageal varices increased.²²

CONCLUSION

Low platelet count on Complete blood examination have significant association with higher grades of oesophageal varices measured on esophago-gastro-dudenoscopy in patients with liver cirrhosis with portal hypertension .This parameter can hence identify the subset of patients who require endoscopy for the prophylactic management of oesophageal varices. Apart from being non-invasive platelet count is a relatively inexpensive test as platelet count and abdominal ultrasound would be obtained on all cirrhotic patients routinely as a part of their clinical workup.

The platelet count is a non-invasive parameter with high accuracy for prediction of Esophageal varices. Cirrhotic patients with normal platelet counts (above 150,000), especially in financially deprived developing countries, can avoid screening endoscopy, because they are at low risk for a variceal bleed and presence of large Esophageal varices in these patients is much less common than in those with thrombocytopenia.

So, therefore, this parameter can be used in predicting propensity to oesophageal varices non-invasively and thus help in starting prophylactic therapy earlier to prevent bleeding and other complications of varices.

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