ORIGINAL ARTICLE

Association Between Platelet Count and Grading of Esophageal Varices in Patients with Liver Cirrhosis

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ABSTRACT

Background: Upper GI endoscopy is the gold standard technique for diagnosing esophageal varices and to assess the risk of bleeding but is invasive in nature, costly, time consuming and burden for the department. Besides this platelet count is also an important tool to predict the esophageal varices in cirrhotic patient and it is a highly accurate test. it has been noted that platelet count in cirrhotic patients with esophageal varices, is less than 100,000/cmm but very few of the data is available so the aim of the current study was to find out the association between mean platelet count and grading of esophageal varices in patients with liver cirrhosis.

Methods: A descriptive cross-sectional study was conducted at the medicine department of Jinnah Postgraduate Medical Center (JPMC), Karachi. For testing platelet count the blood sample was sent to the pathology laboratory of the hospital. Gastroenterologist performed the upper gastrointestinal endoscopy to grade the esophageal varices. Data was analyzed by using the Statistical Package for Social Science (SPSS) version-20. ANOVA with Post-Hoc Tuckey test was applied to find out the correlation between the variables. p-value less than 0.05 was considered as significant.

Results: The mean age of the study participants was 34.9±8.6 years. Majority of the study participants were male (61.1%) as compared to their counterparts. The mean platelet count among the study participants was 113,200±29000 /u L majority of cirrhotic patients included in the study were having grade III of esophageal varices (39.5%). It has been noted that mean platelet count decreased with increasing grade of esophageal varices and the association was significant. Cirrhotic patients having Grade I esophageal varices were having near normal mean platelet count but those who were in Grade V of esophageal varices, having markedly decreased platelet count as compared to Grade I, II, III and IV.

Conclusion: It can be concluded that the mean platelet count is significantly inverse association with the grading of esophageal varices, as low as the platelet count, worst the esophageal varices in patients with liver cirrhosis. So testing mean platelet count can be used for screening purpose of esophageal varices as it is a cost effective test.

Keywords: Cirrhosis, Esophageal varices, Mean Platelet count,

INTRODUCTION

Liver cirrhosis is one of the leading cause of increasing morbidity and mortality rates worldwide. Looking over the global burden of diseases, the liver cirrhosis stand on 13th number (1). The underlying pathology of liver cirrhosis is the inflammation of hepatocytes due to any cause leading to fibrosis of the hepatic tissues. The major etiological factors of liver cirrhosis included hepatitis B, hepatitis C, fatty liver disease and alcohol consumption while minor causes include biliary cirrhosis, splenic or portal vein thrombosis, the thrombotic plaque in the inferior vena cava, seclerosing collangitis, tuberculosis, schistosomiasis, Wilson's disease, hemochromatosis, α-1-antitrypsin deficiency and Idiopathic portal hypertension. The complications include liver failure, disturbed circulation, hepatic encephalopathy and portal hypertension (2). About 50-60% of the patients develop esophageal varices due to the portal hypertension leading to a life threatening bleeding in about 40% of patients and about 20% of patients die within 1 year of esophageal varices. It has been also noted that about 90% of patients of liver cirrhosis have the risk of developing esophageal varices (3).

It has been stated that if the diameter of portal vein is greater than 13mm then it must be labelled as portal hypertension (4). Any interference in portal blood flow increases the portal venous pressure more than 10mmHg which leads to the formation of collateral circulation thus leading to esophageal varices (5). Abnormal dilatation of collateral veins in the lumen of the esophagus is termed as esophageal varices. The American Association for the Study of Liver Disease (AASLD) recommended the screening of all the patients, who are diagnosed as a case of liver cirrhosis, for esophageal varices by using upper gastrointestinal endoscopy. Upper GI endoscopy is the gold standard technique for diagnosing esophageal varices and to assess the risk of bleeding (6-8).

The demerits of upper GI endoscopy are invasive in nature, costly, time consuming and burden for the department (9). There are some other modalities to screen the cirrhotic patients for esophageal varices, including Doppler ultrasonography, computed tomography (CT) and magnetic resonance imaging (MRI) (4, 10). Besides these diagnostic techniques, platelet count is also an important tool to predict the esophageal varices in cirrhotic patient and it is a highly accurate test. it has been noted that platelet count in cirrhotic patients with esophageal varices, is less than 100,000/cmm (3, 11). There are five grades of esophageal varices from Grade I to Grade V on the basis of size, risk of rupture and bleeding, presence of red sign and changes in distal esophagus. Studies found that the chance of developing esophageal varices and its severity in cirrhotic patient is minimized if there is high platelet count (12). Although platelet count is a cost effective method to detect the presence and severity of esophageal varices in cirrhotic patient (13) but very few of the data is available so the aim of the current study was to find out the association between mean platelet count and the grading of esophageal varices in patients with liver cirrhosis.

MATERIAL AND METHODS

A descriptive cross-sectional study was conducted at the medicine department of Jinnah Postgraduate Medical Center (JPMC), Karachi during August 2022 to January 2023. Sample size was calculated by using OpenEpi calculator and was 180. Non-probability convenient sampling technique was used for sample collection. Those patients were included in the study who were either from the age group of 20 years up to 60 years or of either gender or diagnosed case of liver cirrhosis or diagnosed case of esophageal varices while those were excluded who had developed either hepatocellular carcinoma or portal vein thrombosis or drug addicted or patients on vasoactive drugs. Patients were included in the study through outpatient department (OPD), following inclusion

and exclusion criteria. Informed consent was taken from the study participants. For testing platelet count the blood sample was sent to the pathology laboratory of the hospital. Gastroenterologist performed the upper gastrointestinal endoscopy to grade the esophageal varices.

Data was analyzed by using the Statistical Package for Social Science (SPSS) version-20. All the categorical variables were mentioned in frequency and percentages while numerical variable were in mean with standard deviation. ANOVA with Post-Hoc Tuckey test was applied to find out the correlation between the variables. p-value less than 0.05 was considered as significant.

RESULTS

The mean age of the study participants was 34.9±8.6 years while the most commonly affected age group was between the age of 20 years to 40 years with significant association. Majority of the study participants were male (61.1%) as compared to their counterparts but the results were statistically non-significant. The mean platelet count among the study participants was 113,200±29000 /u L majority of cirrhotic patients included in the study were having grade III of esophageal varices (39.5%) while very few were having grade I of esophageal varices (5%) as mentioned in Table 1.

Table 1: Characteristics of study participants

	n=180 (%)	p-value
Age ≤ 40 years ≥ 40 years	 120 (66.7) 60 (33.3)	0.021
Gender Male Female	 110 (61.1) 70 (38.9)	0.965
Grading of esophageal varices I II III IV V	 9 (5.0) 59 (32.8) 71 (39.5) 26 (14.4) 15 (8.3)	0.000

It has been noted that mean platelet count decreased with increasing grade of esophageal varices. Cirrhotic patients having Grade I esophageal varices were having near normal mean platelet count but those who were in Grade V of esophageal varices, having markedly decreased platelet count as compared to Grade I, II, III and IV as mentioned in Table 2. Mean platelet count showed highly significant association with the severity of esophageal varices as the p-value was less than 0.05. The results reported poor prognosis of esophageal varices if the platelet count is decreased.

Table 2: Association of mean platelet count with the grade of esophageal varices

Grading of esophageal varices	Platelet count	p-value
Grade I	147,000 ± 21000	0.000
Grade II	118,000 ± 23000	
Grade III	105,000 ± 25000	
Grade IV	100;000 ± 22000	
Grade V	96,000 ± 26000	

DISCUSSION

Esophageal varices is an abnormal dilatation of collaterally developed veins as a result of portal venous hypertension in the case of liver cirrhosis, resulting in upper gastrointestinal bleeding because of ruptured veins (14). It has been noted that there is 5% annual increase in incidence rate of esophageal varices while disease progress from smaller veins to larger ones is around 10% and the mortality rate due to esophageal varices in cirrhotic patients is 35% (15). Due to this annual increase in morbidity and mortality rates, it is very important to screen all the cirrhotic patients for esophageal varices just to avoid bleeding and hemorrhages (16).

Literature review revealed that in the severe state of liver cirrhosis there is hemostatic disturbance specifically thrombocytopenia has been noted in which platelet count is less than 150,000/ul so testing platelet count can be a predictor of liver cirrhosis developed complications like esophageal varices (17). Literature review revealed that there is a strong association between the low platelet count and development of esophageal varices (18). Current study also found a strong significant association between the platelet count and presence of esophageal varices.

Current study also noted that mean platelet count decreased with increasing grade of esophageal varices. Cirrhotic patients having Grade I esophageal varices were having near normal mean platelet count but those who were in Grade V of esophageal varices, having markedly decreased platelet count as compared to Grade I, II, III and IV. Mean platelet count showed highly significant association with the severity of esophageal varices as the p-value was less than 0.05. Studies favored this finding by reporting association between the low platelet count and grading of esophageal varices and is inverse in nature as the platelet count decreases the grade of esophageal varices increases. Studies linked the low platelet count with the severity of esophageal varices (19). Sarwaret et.al conducted a study on 101 patients, out of them 65 were having esophageal varices while 36 were only having liver cirrhosis without any complication. He found that lower the platelet count (less than 88,000 /uL) is linked with the high grade esophageal varices (20). On the other hand, Cherian et.al reported that platelet count less than 100,000 – 103,000 /uL is significantly correlated with the development of esophageal varices (21).

Some of the studies stated that platelet count is not an accurate test for screening purpose. Literature revealed that the low platelet count in liver cirrhosis has multifactorial causes like Panzer et.al. found that hepatitis C virus (HCV) is responsible for the development of thrombocytopenia in liver cirrhosis (22) and the same is also favored by Iman et.al, she found 32.3% of cirrhotic patient had thrombocytopenia (23). On the other hand, Tafarel et.al reported thrombocytopenia as an independent factor related to esophageal varices. He stated that the if the platelet count less than 92,000 /uL then it is 65.7% sensitive and 57.9% specific test for esophageal varices which needs prophylactic therapy (24).

CONCLUSION

It can be concluded that the mean platelet count is significantly inverse association with the grading of esophageal varices, as low as the platelet count, worst the esophageal varices in patients with liver cirrhosis. So testing mean platelet count can be used for screening purpose of esophageal varices as it is a cost effective test.

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