

Platelet count/splenic size ratio as a non-invasive parameter to predict the presence of esophageal varices in cirrhotics

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Objectives: To compare platelet count/splenic size ratio between patients with esophageal varices and without esophageal varices.

Methodology: It was cross-sectional study conducted at the department of Medicine Fauji Foundation Hospital, Rawalpindi, Pakistan and during 6 months of study 60 patients with cirrhosis of liver were studied. These patients were evaluated for the chronic hepatitis B and C, ascites and splenic size by abdominal ultrasound, albumin, prothrombin time, complete blood count including platelet count and liver functions test. It was determined if the platelet count/splenic size ratio between the two groups was different or not.

Results: Out of 60 patients, 53(88.3 %) were

females, 7 (11.7 %) were males. The mean age was 52 years. All patients were hepatitis C positive. Ascites was present in 14 (23.3%) patient. varices were present in 40 (66.7%) patient, while it was absent in 20 (33.3%). Mean platelet count/splenic size ratio in patients with esophageal varices and without esophageal varices was found to be significantly different ($p=0.000$).

Conclusion: Platelet count/splenic size ratio in patients with esophageal varices and without esophageal varices is different. (Rawal Med J 201;40:371-374).

Key words: Esophageal varices, cirrhosis, splenic size.

INTRODUCTION

There is high prevalence of Hepatitis B and Hepatitis C in Pakistan.¹ Patients with chronic liver disease (CLD) over the years, develop portal hypertension and its associated complications like esophageal varices which not only affect the quality of life but may also lead to life threatening episodes of upper gastrointestinal bleeding.² Esophageal varices develop as a consequence of portal hypertension in patients with CLD and are present in approximately 50% of patients with cirrhosis of the liver. The grade of esophageal varices often correlates with the severity of liver disease.³ Patients who have bled once from esophageal varices have 70% chance of rebleeding and approximately one third of further bleeding episodes are fatal.⁴

With limited access to upper GI endoscopy for screening, there is need to define a non-invasive parameter that can predict the presence of esophageal varices in patients with cirrhosis.⁵ Some of them are platelet count, splenomegaly, portal vein diameter, Child-Pugh classification, prothrombin activity, telangectasias, ascites, transient elastography and a model including spider angiomas, ALT and albumin.⁶⁻⁸ Splenomegaly and

decreased platelet count are predictors of portal hypertension. However, in patients with CLD, the presence of low platelet count may result from causes other than portal hypertension, like shortened lifetime of platelets, decreased thrombopoietin production, or myelotoxic effect of hepatitis viruses.⁹ Presence of splenomegaly in cirrhotic patients is the result of vascular disturbances related mainly to portal hypertension. Ratio of platelet count and splenic size on ultrasound abdomen is used as predictor of esophageal varices. Both these tests are carried out routinely and non-invasively and the cost of both these tests, even together is minimal compared to upper GI endoscopy.¹⁰ The aim of this study was to assess platelet count/splenic size ratio in patients with cirrhosis and esophageal varices.

METHODOLOGY

It was a cross-sectional study carried out in medical unit of Fauji Foundation Hospital, Rawalpindi, Pakistan. The duration of study was 6 months. The study was conducted after taking written Informed Consent. The sample size was 60 and subjects were chosen by non-probability sampling. All patients

with liver cirrhosis were included this study and patients who had upper gastrointestinal bleed, had undergone sclerotherapy or band ligation procedures were excluded from the study.

A complete physical examination was conducted and platelet count, alanine aminotransferase, alkaline phosphatase, total bilirubin, serum albumin, prothrombin time, hepatitis B surface antigen, anti-hepatitis C virus antibodies, and ultrasound abdomen were performed. Platelet count/splenic size ratio was calculated and upper GI endoscopy was performed.

Data were analysed using SPSS version 19.0. All the patients were divided in 2 groups on the basis of presence or absence of esophageal varices then we compared the quantitative data between 2 groups using independent sample, t-test and p-value was calculated. A $p < 0.05$ was considered statistically significant.

RESULTS

The mean age of patients was 52 years, 53(88.3 %) were females, 7(11.7 %) were males. All patients were hepatitis C positive and ascites was present in 14(23.3%) patient. Of 60 patients varices were present in 40(66.7%) patients, while it was absent in 20(33.3%) patients (Table 1).

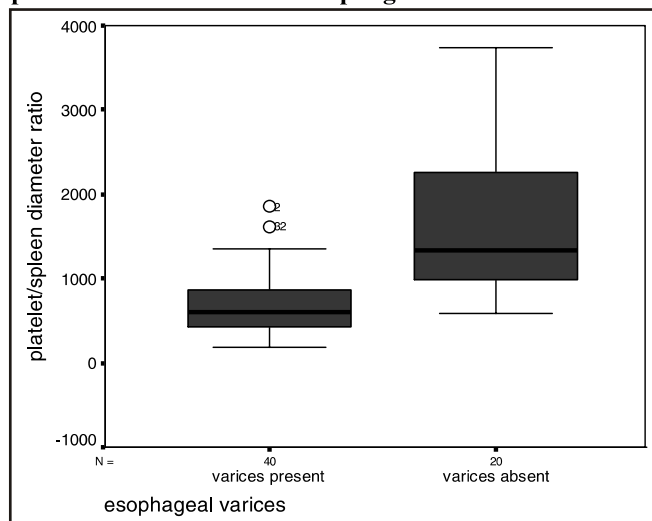
Table 1. Qualitative Variables.

Variable		Number	Percent
Gender	Male	7	11.7
	Female	53	88.3
Esophageal varices	Present	40	66.7
	Absent	60	33.3
Anti HCV antibodies		60	100
Ascites	Present	14	23.3
	Absent	46	76.7

Mean platelet count in patients with varices was $96.75 \times 10^9/L$, while it was $207.35 \times 10^9/L$ in patients without varices. Mean splenic diameter was 145.97mm in patients with esophageal varices and it was 121.40mm in patients without esophageal varices. The ratio between platelet count and splenic size was calculated. Mean ratio was 696.05 in patients with esophageal varices and 1659.45 in

patients without esophageal varices (Fig. 1).

Fig. 1. Boxplots of Platelet count/Splenic size ratio in patients with and without Esophageal Varices.



The Mean platelet count/splenic size ratio differ by -963.40. The 95% confidence interval for the true difference is from -1379.128 to -547.672. Therefore, we found statistically significant difference between the mean platelet count/splenic size ratio in patients with esophageal varices and without esophageal varices and this difference is unlikely to be due to chance.

We also compared the qualitative data between two groups using chi-square test. For finding difference between distribution of male and female gender between two groups, the observed significance level for Pearson Chi-square value of 3.962 is 0.047 which is almost equal to 0.05.

DISCUSSION

Our study found that 66.7% of cirrhotic patients had esophageal varices diagnosed by endoscopy which is similar to an earlier study.¹⁰ And this result is similar to the range of 24-80% showed in literature⁸ and reminds us that a significant part of cirrhotic patients are unnecessarily submitted to this procedure.¹⁰ The present study further corroborates the results of earlier studies. Giannini et al,¹¹ proposed the platelet count-spleen diameter ratio of ≤ 909 , as an accurate non-invasive marker for the presence of esophageal varices. This was further

validated in other studies.^{3,12}

Our study population comprised predominantly of patients with hepatitis C related cirrhosis. Similar findings were reported by another Pakistani study.¹³ Sen et al, found the platelet count-spleen diameter ratio of ≤ 650 as a sensitive non-invasive marker [Area under curve (AUC) of 0.81] in HCV related cirrhosis.¹⁴

The most common result of these studies was that parameters directly or indirectly linked to portal hypertension, such as splenomegaly and decreased platelet count, were predictors of the presence of esophageal varices. However, in patients with CLD the presence of decreased platelet count may depend on several factors other than portal hypertension. On the other hand, the presence of splenomegaly in cirrhotic patients is likely the result of vascular disturban

Our study has many limitations. First we had small sample size. Moreover our sampling was not random. It was convenient non probability sampling so that is unlikely to be representative. Also our patients represented a selected group of patients with liver cirrhosis attending a tertiary care center. Our patients had liver disease of viral origin, results need to be validated in other causes of liver cirrhosis like alcohol liver disease, Non-alcoholic steatohepatitis. Also, we did not evaluate the role of platelet count/splenic size ratio as independent risk factors for the presence of esophageal varices. ces that are mainly related to portal hypertension.

CONCLUSIONS

Our findings add to growing body of evidence in favor of non-invasive markers of esophageal varices. Risk stratification based on these factors may help clinicians identify patients who would most likely benefit from referral for screening for gastroesophageal varices. These findings need to be verified with further prospectively collected data. Cost-effectiveness analysis should be performed to determine which strategy is best that is screening all cirrhotic patients versus screening only high-risk patients versus no screening.

Authors' contribution:

Conception and design: Kausar Malik

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Analysis and interpretation of the data: Shazia Amir Khan

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Critical revision of the article for important intellectual content:

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