

# LOW PLATELET COUNT AS AN EARLY INDEX FOR OESOPHAGEAL VARICES IN PATIENTS WITH PORTAL HYPERTENSION

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## ABSTRACT

**Objective:** To determine if low platelet count can be used as an index for detection of esophageal varices in patients with portal hypertension.

**Material and Methods:** This cross sectional analytic study was conducted in Bilal Medical Trust Hospital, Pir Baba and Kuwait Teaching Hospital, Peshawar, Pakistan from January 2015 to December 2015. After approval from the hospital ethical and research committee the study was conducted and it included patients recruited through non probability consecutive sampling, presenting to OPD. A detailed history and physical examination was done after which the liver was thoroughly assessed by a detailed ultrasound of the abdomen. The liver size, echo pattern of established signs of cirrhosis, uneven hepatic margins, increased parenchymal reflectivity, coarseness, increased echo graphic contrast between right lobe of liver and right kidney, hypertrophied caudate lobe, and attenuated hepatic veins were assessed to diagnose cirrhosis. Hepatic focal lesions and portal vein patency and diameter along with splenic size, Portal vein, hepatic artery, and splenic artery flow and patency were noted. Full blood count, ALT, hepatitis Band C serology was done at the time of admission. A screening endoscopy was undertaken next to assess the presence or absence of the varices. The varices after detection was graded according to the Paquet grading system.

**Results:** Among the total 123 patients examined 60% were females and 40% were males. Minimum age was 30 and maximum age was 70. Average age was 51. Among different age groups 4 (3.2%) belonged to age group 30 to 40 years, 33(26.2%) belonged to age group 40 to 50 years, 47 (38.2%) aged 50 to 60 years and 40(32.5%) belonged to 60 to 70 years age group. The serology done for hepatitis revealed hepatitis C in all of the cases as an etiology 123 (100%). The platelet count was measured next and the data further stratified accordingly. About 8(6.5%) had a platelet count between 30-50,000. Around 18(14.6%) had a platelet count in the range of 50-70,000. Of all patients maximum 33(26.8%) had the platelet count in the range of 70-90,000. Also another 31 (25.2%) had the same counts in the range of 90-110,000. In about 20(16.2%) the platelet counts were in the range of 110-130,000. Only 13(10.5%) had platelet counts in the range of 130-150,000. Next the data was analyzed for the esophageal varices. Again the data was subdivided in to four groups according to the presence and grades of varices. A total of 32(26%) had no varices on endoscopy. About 31(37%) had Grade 1 varices, whereas 14(12%) had Grade 2 varices. An alarming 31 (38%) had Grade 3 varices on endoscopy. After running correlation the p value for the variables varices and platelet count was 0.098 (significant at 10%) and as such showed no clear and consistent relationship between the two variables. However on further extrapolating the study it was found that gender (females) showed a partial relationship (Table 1) between falling platelet counts and higher grades of varices (p value 0.02).

**Conclusion:** Low platelet count alone cannot be used as an early index for the presence of esophageal varices in patients with portal hypertension.

**Key Words:** Platelet count, esophageal varices, portal hypertension.

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## INTRODUCTION

Cirrhosis and its complications are an important health issue in Pakistan. According to a recent study it has been suggested that approximately ten million people in Pakistan which makes 6% of the total population are living with HCV infection.<sup>1</sup> It has been estimated that Pakistan has the second highest prevalence of hepatitis

C in the world along with a very high frequency of liver cirrhosis.<sup>1</sup> Liver disorders especially cirrhosis is thus a major health issue in our country reaching to epidemic proportions<sup>2</sup>, and is a frequent cause of death. Out of the many complications portal hypertension deserves special attention. If left untreated it can lead to massive and life threatening upper GI bleeding. According to the recommendations endoscopy is a useful tool for early detection and timely management of esophageal varices. It has been recommended that all patients should undergo a routine screening endoscopy at the time when cirrhosis is diagnosed<sup>3</sup>, however this approach has been difficult in our setup because of the limitation of financial and technical support. Instead worldwide a number of noninvasive approaches have been devised to overcome this difficulty<sup>4</sup>. One such approach is the use of low platelet count as a predictor of early esophageal varices<sup>5,6</sup>. The aim of this study was to assess the utility of low platelet count as a surrogate marker for the presence of varices and to see if varying number of platelets can be used to grade these varices too.

**MATERIAL AND METHODS**

The following study was undertaken in Bilal Medical Trust Hospital, Pir Baba and Kuwait Teaching Hospital, Peshawar, Pakistan. The duration of study was from January 2015 to December 2015.

After approval from the hospital ethical and

research committee the study was conducted and it included patients recruited through non probability consecutive sampling, presenting to the ward, aged more than 20 years with chronic liver disease. All patients with advanced cirrhosis (Child-Pugh class C), hepatocellular carcinoma, portal vein thrombosis, intravenous drug abuse or current alcohol addiction and any treatment with b-blockers, diuretics or any vasoactive drugs were excluded from the study. A written and informed consent was taken and patients were subjected to detailed history and clinical examination after which an ultrasound was performed for the presence of signs of cirrhosis. The patients were then subjected to upper GI endoscopy and the presence or absence of varices was confirmed, they were also graded accordingly. Other laboratory parameters were the platelet count, hemoglobin, ALT, and hepatitis B and C serology which were done at the time of admission.

**RESULTS**

Among the total 123 patients examined 60% were females and 40% were males (Figure 1). Minimum age was 30 and maximum age was 70. Average age was 51. Among different age groups 4 (3.2%) belonged to age group 30 to 40 years, 33(26.2%) belonged to age group 40 to 50 years, 47 (38.2%) aged 50 to 60 years and 40(32.5%) belonged to 60 to 70 years age group. (Figure 2). The serology done for hepatitis revealed

**Table 1: Correlation**

		plt	Alt	Hbg	Var	Age	Gend
Plt	Pearson Correlation	1	-.029	-.045	.152	.075	.182*
	Sig. (2-tailed)		.751	.625	.098	.418	.049
	N	120	120	120	120	120	118
Alt	Pearson Correlation	-.029	1	.010	.017	-.043	.026
	Sig. (2-tailed)	.751		.915	.854	.638	.778
	N	120	120	120	120	120	118
Hbg	Pearson Correlation	-.045	.010	1	.062	.058	-.096
	Sig. (2-tailed)	.625	.915		.503	.527	.300
	N	120	120	120	120	120	118
Var	Pearson Correlation	.152	.017	.062	1	-.062	.210*
	Sig. (2-tailed)	.098	.854	.503		.500	.022
	N	120	120	120	120	120	118
Age	Pearson Correlation	.075	-.043	.058	-.062	1	-.100
	Sig. (2-tailed)	.418	.638	.527	.500		.284
	N	120	120	120	120	120	118
Gend	Pearson Correlation	.182*	.026	-.096	.210*	-.100	1
	Sig. (2-tailed)	.049	.778	.300	.022	.284	
	N	118	118	118	118	118	118

\*.Correlation is significant at the 0.05 level (2-tailed)

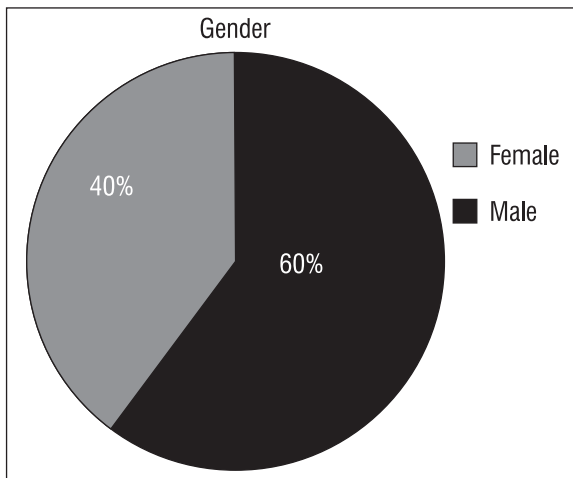


Figure 1: Gender of patients

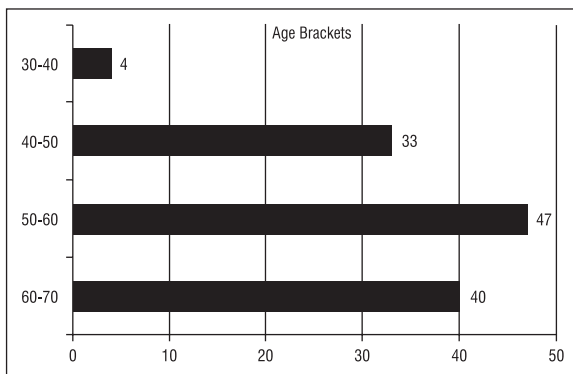


Figure 2: Age distribution of patients

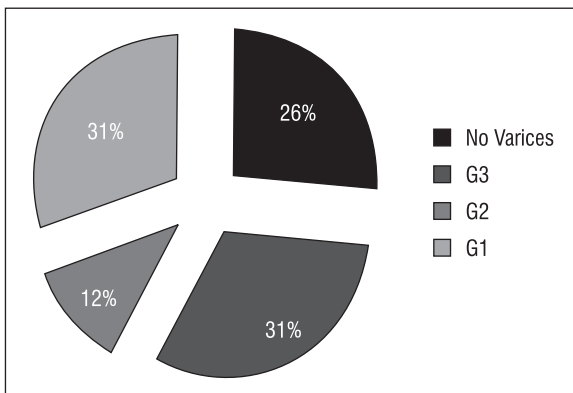


Figure 3: Varices

hepatitis C in all of the cases as an etiology 123 (100%). The platelet count was measured next and the data further stratified accordingly. About 8(6.5%) had a platelet count between 30-50,000. Around 18(14.6%) had a platelet count in the range of 50-70,000. Of all patients maximum 33(26.8%) had the platelet count in the range of 70-90,000. Also another 31(25.2%) had the same counts in the range of 90-110,000. In about 20(16.2%) the platelet counts were in the range of 110-130,000. Only 13(10.5%) had platelet counts in the range of 130-150,000.

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After running correlation the p value for the variables varices and platelet count was 0.098 (significant at 10%) and as such showed no clear and consistent relationship between the two variables. However on further extrapolating the study it was found that gender (females) showed a partial relationship between falling platelet counts and higher grades of varices (p value 0.02). (Table 1)

## DISCUSSION

According to a recent study it has been suggested that approximately ten million people in Pakistan which makes 6% of the total population have been diagnosed with HCV infection.<sup>1</sup> As such it has been estimated that Pakistan has the second highest prevalence of hepatitis C in the world along with a very high frequency of liver cirrhosis<sup>1</sup>. Liver disorders especially cirrhosis is thus a major health issue in our country reaching to epidemic proportions<sup>2</sup>, and is a frequent cause of death. Out of the many complications portal hypertension deserves special attention. If left untreated a dreaded complication of varices it is a variceal bleed which carries significant mortality and morbidity.

According to the recommendations endoscopy is a useful tool for early detection and timely management of esophageal varices. It has been recommended that all patients should undergo a routine screening endoscopy at the time when cirrhosis is diagnosed<sup>3</sup>, however this approach has been difficult in our setup because of the limitation of financial and technical support. Instead worldwide a number of noninvasive approaches have been devised to overcome this difficulty<sup>4</sup>. One such approach is the use of low platelet count as a predictor of early esophageal varices<sup>5,6</sup>.

The only major limitation of the use of platelet count as an index for the presence or absence of portal hypertension is the fact that a number of other factors may also effect the platelet count.<sup>7</sup> For instance platelets are potent acute inflammatory markers and they may be increased in acute infections or sudden massive bleeds.<sup>8</sup> Also immune mediated destruction, hepatocellular carcinoma, hypersplenism, portal vein thrombosis may affect the platelets count. All such patients were excluded from the study by appropriate history and physical examination. The discriminative power of platelet count alone is high in people with

cirrhosis due to infective causes because in all such patients platelet count is less amenable to changes due to other factors<sup>9</sup>.

In our study we found that the presence of varices had no clear relationship with the low platelet count this is in contrast to a study carried out by yang et al<sup>10</sup> who found that low platelet count could effectively predict the presence of esophageal varices. Similarly another study done by Lahmidani et al<sup>11</sup> clearly showed the presence of various grades esophageal varices by a dropping platelet count. There was no consistent relationship with lower grades of varices against varying number of the platelets in our study which is in striking contrast to a study done by of Abbasi et al<sup>12</sup>. It stated that the severity of thrombocytopenia increase as the grade of esophageal varices increase.

After running correlations between various variable it was found that gender (females) bore a positive correlation with varices and platelet counts (p value 0.022). This finding has not been documented in all other previous studies and as such is a new development. In our population low platelet count can be used as a surrogate marker for presence of varices only in the female gender. The exact reason for this trend is still not known and further studies are needed in this direction to assess this impact in detail.

In all other studies of a similar nature there was a consistent trend of falling platelet counts with rising grades of esophageal varices and as such various cut offs were defined to predict the grades of esophageal varices with a definitive number of platelets. For instance, Schepis et al<sup>13</sup> did a study and showed that presence of EVs could be predicted by a platelet count of less than  $100 \times 10^9/L$  (odds ratio [OR] 2.83, 95% CI 1.27-6.28). Agha et al<sup>14</sup> introduced a median platelet count of 82,000 vs. 172,000/ $\mu L$ ;  $P < 0.0001$  in cirrhotic patients to suggest the presence or absence of EV, respectively. Tafarel et al<sup>15</sup> also produced a similar result. In our study however since there is no consistent relationship of platelet counts to the varying grades of varices these predictions cannot be made with certainty. A major drawback of this study was the fact that it was done on a relatively small population size with little variability in their demographics. Also due to technical and financial difficulties studies like mean platelet volume (MPV), platelet distribution width (PDW), or plateletcrit (PCT) could not be assessed so the full impact of thrombocytopenia on varices could not be assessed properly. Due to a similar reason we could only include patients with a positive serology for viral hepatitis and could not perform autoimmune screening copper studies or core antibodies for hepatitis B so other unknown factors effecting the platelet count in a

chaotic manner may still be present in these patients and further studies are needed in this regard to fully understand these intricate relationships.

In our study all of the cases 123(100%) were positive for HCV, suggesting a very high disease burden due to hepatitis C in our setup. This finding is in accordance with other studies in populations with a similar demographic profile nationally as well as internationally.<sup>16</sup>

## CONCLUSION

Low platelet count bear no clear relationship with varying grades of varices and as such this parameter cannot be used to predict the presence of esophageal varices.

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#### **AUTHOR'S CONTRIBUTION**

Following authors have made substantial contributions to the manuscript as under:

**Mohammad N:** Idea, concept.

**Mehboob S:** Manuscript writing.

**Haq IU:** Data collection, references writing.

**Shah FU:** Manuscript review.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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