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A CROSS-SECTIONAL SURVEY TO DETERMINE THE ACCURACY OF PLATELETS DIAGNOSTICS AND SPLEEN TO COUNT DIAMETER RATIO TO IDENTIFY ESOPHAGEAL VARICES WITHIN CHORIONIC LIVER DISEASES DUE TO HEPATITIS-C

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Abstract:

Objective: *This study was focused on determining the diagnostics platelet accuracy, count to spleen ratio of diameter for the existence of oesophageal varices within patients with chronic liver disease which is secondary to Hepatitis C taking endoscopy as the gold standard.*

Method: *It was Cross-sectional survey, held at Services Hospital, Lahore in the timeframe of six months starting from November 2017 to April 2018. Non-probability sampling technique was utilized. After obtaining an informed consent from the patients, 182 patients satisfying medical case definition of Chronic Liver Diseases secondary to Hepatitis C were incorporated in the research study. Upper GIT endoscopy was carried out in compliance with standard procedure and oesophageal varices equivalent and above 5mm was taken as a positive value. Complete blood count (CBC) was carried out for the measurement of platelet in number/microliter (µl) and measurement of spleen diameter in (mm) was done through abdominal ultrasonography (USG).*

Results: *A total number of 182 patients with CLD secondary to HCV participated in the study. The mean age range among participants was 50.76±12.88 years. The gender ratio was 47.8% males and 52.2% females as comprising over 87 males and 95 females out of 182 patients. The EVs were observed present in 96 (53%) and absent in 86 (47.8%) patients in the Upper GIT endoscopy. The patients Average PC/SD ratio including varices was 831.0288 and in absence, it was 1358.4155. The patients average PC/SD ratio was 1080.0730. The PC/SD ratio's specificity and sensitivity in compliance to the accuracy of diagnostics was 58.9% and 71.7% respectively. The positive and negative predictive values were 66% and 65% respectively and EVs prediction was 65.7% in accordance with diagnostic accuracy related to PC/SD ratio.*

Conclusion: *The ratio of PC/SD is non significantly linked with the prediction of oesophagal varices with 65.7% accuracy of diagnostics.*

Keywords: *Platelet Count to Spleen diameter ratio, oesophagal varices, Chronic liver disease, Hepatitis C*

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INTRODUCTION:

Obstinate injury in Liver parenchyma due to virulent infections, autoimmune hepatitis, iron in Hemochromatosis, toxins and copper deposition of within Wilson disease are the main reasons for Chronic Liver Disease. Hepatitis C infection is most common in Pakistan from all of the above-said causes of cirrhosis [1]. CLD has no symptoms till the ending stage of liver disease manifesting with ascites, gastroesophageal variceal bleeding, spontaneous bacterial peritonitis, coagulopathy, hepato-renal syndrome and encephalopathy. According to an estimation by WHO, 1.1% of deaths occur due to ESLD [3]. Blood pressure is increased due to cirrhosis of the liver in the portal system and when gets above 20 mmHg it causes veins dilatation on junctions of Porto systematic situated at anorectal, gastro oesophagal and peri-umbilical junctions. The dilated veins present at the gastro-esophageal junction are named as gastro-oesophagal varices. A huge ratio of about 24-80% of ESLD patients is having gastroesophageal varices [2]. In these varices, 20-40% of patients get bleeding [4] and rate of mortality for variceal bleeding is round about 20-30% [3]. In the year 2005 Baveno IV consensus stated that each patient with cirrhotic liver should go for screening endoscopy for timely diagnosis of oesophagal varices [4]. Primary prophylaxis (nonselective lockers or endoscopic and ligation) should be given to the patients with higher risk oesophagal varices (HREVs) to prevent variceal bleeding due to which risk of variceal bleeding is decreased up to 50% [4]. According to AASLD (American Association for the Study of Liver Disease), the screening by endoscopy in decompensated CLD should be done once in the year and in compensated CLD it should be done once in 2-3 years, in the case of absence of various at index endoscopy [5]. For the reduction of burden on endoscopy units, many studies have not been done to forecast presence of varices through non-invasive parameters including biochemical markers and clinical radiological such as the presence of ascites, liver span, portal vein diameter, spleen diameter, platelet count, and liver enzymes serum albumin. Many studies have shown the diagnostic accuracy of PC/SD ratio to indicate the presence of oesophagal varices and there is inconsistency among the statistics in their results. Amin. K et al, Mattos AZ et al, and Sarwar. S et al, have shown cut off value as 909 of PC/SD ratio. Amin K et al presented a significant PC/SD ratio's diagnostic accuracy for the oesophagal varices, whereas, Sara. S et al and Mattos AZ et al presented non-significant PC/SD ratio's diagnostic accuracy for the oesophagal varices, there is a need for more studies to see PC/SD ratio 's diagnostic accuracy for the oesophagal varices and to put on noninvasive limits (PC/SD) for oesophagal varices screening.

METHODS:

It was Cross-sectional survey, held at Services Hospital, Lahore in the timeframe of six months starting from November 2017 to April 2018. A total number of 182 patients with CLD secondary to Hepatitis C came joined research after giving informed consent they were incorporated in the study program. Patient was passed through detailed medical inspection and their previous medication history was obtained. Measurement of spleen diameter in millimetres was carried out through ultrasonography and Platelet count was also done. To know the existence of oesophagal varices, upper gastrointestinal endoscopy was done by the experienced staff. Software SPSS was used for statistical data analysis.

RESULTS:

Our study consisted of over 182 cases of CLD secondary to HCV infection. The mean age was 50.76±12.88. The gender ratio was 47.8% males and 52.2% females as comprising over 87 males and 95 females out of 182 patients. In the means ± standard deviations of the Platelet count (128116.68 ± 82727.748), PC/SD ratio (1080.0719 ± 809.12149) and spleen diameter (127.50 ± 24.760). There were 103 (57.3%) cases having a ratio of PC/SD lower than 909, while 77(47.9%) were having a ratio of PC/SD higher than 909. Average of PC/SD value possessing ratio of PC/SD < 909 is 561.1750 ± 175.00 and those of PC/SD value > 909 is 1774.20 ± 804.90. It was revealed through Gastroscopy findings 96(53%) cases have EVs present and absent EVs in 86(47%) cases. The average spleen diameter within the patients having EVs is 131.50 ± 24.286 and the patients without EVs is 122.89 ± 24.620. The average PC/SD ratio value in patients possessing EVs on Gastroscopy is 831.0290 ± 594.32059 and in patients not possessing EVs 1358.4149 ± 922.64750. Data analysis of EVs based on PC/SD and taking Gastroscopy as a gold standard test for EVs detection found 67 TP (true positive) cases, 36 FP (false positive) cases, 51 TN (true negative) cases and 28 FN (false negative) cases. The PC/SD ratio's specificity and sensitivity was 58.8% and 71.6% respectively. The positive and negative predictive values were 66% and 64.9% respectively. The positive LR+ (likelihood ratio) and NR are 1.75 and 0.48 respectively and diagnostic accuracy 65.6%.

Table – I: Variables (Range, Minimum, Maximum, Mean and SD)

Variables	Range	Minimum	Maximum	Mean	±SD
Age (Years)	67	18	85	50.82	12.912
Platelets Count/ml	411000	23000	434000	128116.7	82727.75
Spleen Diameter (mm)	130	80	210	127.49	24.758
PC/SD Ratio Value	4175.7	164.28	4340	1080.072	809.1215

Table – II: Esophageal varices on Gastroscopy

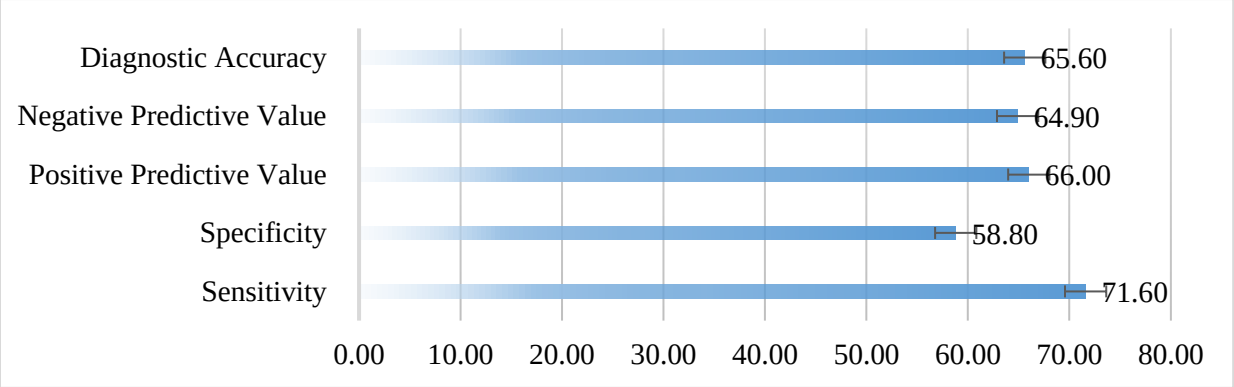
Details			Esophageal varices on Gastroscopy		Total
			> present on Gastroscopy	Absent on Gastroscopy	
Oesophagal varices on platelet count to spleen diameter ratio		Count	68	35	103
	PCSD less than 909	% within esophageal varices on platelet count to spleen diameter ratio	7.60	41.20	57.20
		Count	27	50	77
	PCSD more than 909	% within esophageal varices on platelet count to spleen diameter ratio	28.40	58.80	42.80
Total		Count	95	85	180
		% within esophageal varices on platelet count to spleen diameter ratio	100.00	100.00	100.00

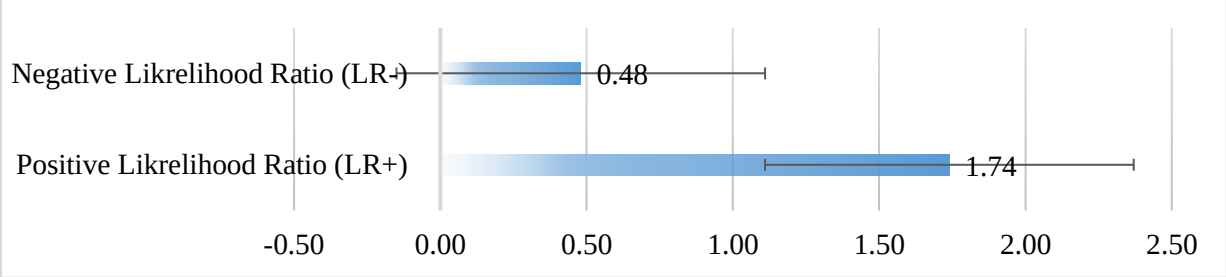
Table – III: Esophageal varices on Gastroscopy

Details			Esophageal varices on Gastroscopy		Total
			> present on Gastroscopy	Absent on Gastroscopy	
Oesophagal varices on platelet count to spleen diameter ratio		Count	68	35	103
	PCSD less than 909	% within esophageal varices on platelet count to spleen diameter ratio	66.00	34.00	100.00
		Count	27	50	77
	PCSD more than 909	% within esophageal varices on platelet count to spleen diameter ratio	35.10	64.90	100.00
Total		Count	95	85	180
		% within esophageal varices on platelet count to spleen diameter ratio	52.80	47.20	100.00

Table – IV: Various Values Stratification

Data	Value
Sensitivity	71.60
Specificity	58.80
Positive Predictive Value	66.00
Negative Predictive Value	64.90
Diagnostic Accuracy	65.60
Positive Likrelihood Ratio (LR+)	1.74
Negative Likrelihood Ratio (LR-)	0.48





DISCUSSION:

The bleeding of Upper GIT is a famous issue related to CLD. I. One of the most common causes of CLD in Pakistan is HCV infection [1]. To reduce the risk of mortality caused by upper GIT bleeding, In the year 2005, Baveno IV consensus on the updated of endoscopy suggested that for early detection of EVs and institution of primary prophylaxis, once the EVs are present on Gastroscopy, CLD patients should be screened at the time of diagnosis for early detection [4]. Gastroscopy is an aggressive process possessing the risk of infection transfer, expensive and limited availability, Platelets count and spleen diameter ratio as non-invasive constraints are studied by many researchers [2 – 7] to observe the accuracy of diagnostic to forecast EVs. Two parameters are used by the PC/SD ratio, which is regularly done in cirrhotic patients. Mean age in this study is 50.82% further comparable to both of the studies by Mattos et al (56.6%) [6] and Amin. K et al (57.61%) [3]. In this study male to female ratio is 1:1.1 having a female majority with 52% showing consistency with the research study by Amin. K et al where the male to female ratio was 1:1.03 [3]. The EVs diagnosed with the Gastroscopy is 52.9% in this study lies in the range of 24% – 80% as mentioned in the literature [6]. This exposes that 50% of patients who got screening endoscopy, do not need endoscopy for EVs prior discovery as actually through an invasive procedure they are susceptible to infections. EVs can be detected through non-invasive constraints for the prevention of the risks related to Gastroscopy. The researchers have

more focus on PC/SD ratio then noninvasive constraints because after a time interval platelet count declines in CLD's natural course due to immune-mediated demolition of platelets, hypersplenism, alcohol, declined construction of thrombopoietin and reduced construction of platelets secondary to myelotoxic effect of virulent hepatitis. In the course of CLD which is secondary to portal hypertension, the spleen diameter rises. The main concept in this study states that PC/SD declines throughout the natural duration of disease because of reduction in platelet count and rise in spleen size, with problems of CLD as like EVs. The risk of expansion of EVs rises within the patients having a decline in the ratio of PC/SD. In this study cut off value 909 is used as also used in other studies [3, 6, 7]. In this research study 68 patients (71.7%) possessing ratio of PC/SD < 909 were having EVs on Gastroscopy and 35 patients (41.2%) were not having EVs on Gastroscopy. In this study, 50 patients (58.9%) possessing PC/SD Ratio>909 were not having EVs on Gastroscopy, whereas, 27 patients (28.8%) possessing PC/SD > 909 were having EVs on Gastroscopy. The PC/SD accuracy of diagnostics is similar to the study presented by Mattos et al (68.9%) by using 95% CI (confidence interval), PC/SD ratio possessing 71.5% sensitivity, 58.8% specificity, 66% PPV, 64.5% NPV and 65.6% accuracy of diagnostic [6]. This study does not support the usage of PC/SD ratio for forecasting EVs due to the risk of missing the patients having EVs is unsafe which leads to the risk of bleeding from EVs having larger mortality in CLD patients [4]. There is a need for re-evaluation for the cut off value (909) to detect EVs as suggested by many studies [6 – 8].

CONCLUSION:

This study does not support the ratio of platelet count/spleen diameter to be utilized for predicting EVs in cirrhotic patients. Cirrhotic patients must have a screening endoscopy for the identification of EVs at the time of diagnosis. PC/SD ratio possessing a dissimilar cut off value and other non-invasive constraints should be promoted for reducing the load on health promoting systems and to make it cost affordable for early discovery of EVs and beginning primary prophylaxis for EVs.

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