

## Sensitivity and Specificity of Platelet Count/Splenic Diameter Ratio for Prediction of Oesophageal Varices in Indian Cirrhotics

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### ABSTRACT

**Introduction:** Development of esophageal varices and subsequent bleed in cirrhotics is the leading cause of mortality. The use of non-invasive methods to predict the presence of esophageal varices would help restrict endoscopic studies to those with a high probability of having varices. Various non-invasive tests have been tried as alternate methods to predict the presence of esophageal varices.

**Material and method:** We studied 180 cirrhotic patients at Mahatma Gandhi medical college, Jaipur.

Diagnosed cases of cirrhosis without any past history of upper GI bleed were included in study. Patient with history of fever, intake of antiplatelet drug, splenectomy and ongoing variceal bleed were excluded from study. We aimed to evaluate whether a ratio of platelet count to spleen diameter <909 could be used in Indian population to predict the presence of varices.

**Result:** 85.6% patients of liver cirrhosis had low platelet count, while only 14.4% patients had platelets in normal range. Platelets count in predicting the severity of oesophageal varices was statistically significant ( $p < 0.0001$ ).

52.8% patients had splenic diameter >125mm. Significant correlation was found between the splenic diameter and severity of varices ( $p < 0.0001$ ).

In this study maximum 66.11% patients had PC/SD ratio below 909 while remaining 33.9% patients had PC/SD ratio above 909. On comparing PC/SD ratio with severity of varices, there was significant correlation ( $p < 0.0001$ ).

**Conclusion:** Platelet count/spleen diameter is a good predictor of oesophageal varices. The use of the platelet count/spleen diameter ratio also safely identified patients without oesophageal varices.

**Key words:** Sensitivity, Specificity, Platelet Count/Splenic Diameter Ratio, Prediction, Oesophageal Varices, Indian cirrhotics

### INTRODUCTION

Liver cirrhosis is characterized by extensive fibrosis, not only involving hepatic parenchyma but also the portal tract leading to the well-known complication of portal hypertension<sup>1</sup>. Portal hypertension results in various clinical manifestations in patients with liver cirrhosis; like, the development of esophageal varices as sequelae of this portal hypertension & subsequent bleeding results in a life-threatening situation in these patients<sup>3</sup>.

Moreover, 15%-20% of cirrhotic patients develop upper gastrointestinal bleeding due to esophageal varices per year, and 20%-30% of them die due to this bleeding within the first 4-6 weeks<sup>4</sup>. Guidelines suggest upper gastrointestinal endoscopy (UGIE) as gold standard for determining the presence and size of esophageal varices<sup>7</sup>. The use of non-invasive methods to predict the presence of esophageal varices would help restrict endoscopic studies to those with a high probability of having varices. Recent studies have emphasized the use of non-invasive methods to identify patients with the

intention of avoiding endoscopy in low-risk cases<sup>1-5</sup>. Various non-invasive tests have been tried as alternate methods to predict the presence of esophageal varices. Among these, the ratio of platelet count to spleen diameter is a widely accepted one. As proposed by Giannini et al, the use of the platelet count (PC)/spleen diameter (SD) ratio is proposed as an effective noninvasive tool for predicting the presence of varices<sup>9</sup>.

## MATERIAL AND METHOD

In a hospital based observational study 180 consecutive diagnosed cirrhotics in department of Medicine at Mahatma Gandhi medical college, Jaipur, Rajasthan were evaluated from January 2018 to June 2019. We included patients with a diagnosis of cirrhosis (made by clinical, biochemical and radiological criteria) without any past history of upper GI bleed. We excluded those cases of cirrhosis with history of upper GI bleed, variceal ligation, fever, intake of antiplatelet drug, splenectomy, any surgery for portal hypertension. Upper GI endoscopy and ultrasound was done for all study subjects.

The sensitivity and specificity of platelet count splenic diameter ratio was measured by comparison of platelet count splenic diameter ratio with grading of oesophageal varices. SPSS version 25 was used for statistical analysis.

## RESULTS

Among studied 180 patients with cirrhosis, 162 (90%) males and 18 (10%) were females. In our study we found that the main etiology of liver cirrhosis was alcohol consumption. 66.1% cases were alcoholics, followed by viral hepatitis (16.7%), auto immune disorder (9.4%) and NASH (7.7 %).

Upper GI endoscopy showed the presence of varices in 139 (77.2%) of cases of which maximum cases in this study had grade II varices 32.2% followed by grade I varices (30%) and grade III varices (15%).

In our study 66.11% patients had PC/SD ratio below 909 suggesting significant portal hypertension while remaining 33.9% patients had PC/SD ratio above 909. When we correlated PC/SD ratio with severity of varices, a significant correlation was seen ( $p < 0.0001$ ).

In our study we found sensitivity of 79.8% and specificity of 80.5% for cut off value of PC/SD ratio 909 for presence of esophageal varices.

**Table 1: Distribution of cases on the basis of Gender**

Gender	Number(n)	Percentage %
Male	162	90
Female	18	10
Total	180	100

**Table 2: Distribution of cases on the basis of Etiology**

Etiology	Number (n)	Percentage (%)
Alcoholism	119	66.1
Viral Hepatitis	30	16.7
Autoimmune disorder	17	9.4
NASH	14	7.7

**Table 3: Distribution of cases on the basis of Endoscopic findings**

Endoscopic findings	Present(n)	Percentage %	Absent(n)	Percentage %
Oesophageal varices	139	77.2	41	22.7
Portal Hypertensive gastropathy	22	12.2	158	87.8

**Table 4: Distribution of cases on the basis of Varices Grading**

Grading	Number(n)	Percentage %
Normal	41	22.7
Grade I	55	30.6
II	57	31.7
III	27	15.0
Total	180	100

**Table 6: Diagnostic importance of PC/SD for varices**

Sensitivity	79.8%
Specificity	80.5%
Positive Predictive Value	93.3%
Negative Predictive Value	55%

**Table 5: Distribution of cases on the basis of Platelet count/ Splenic diameter (PC/SD) ratio**

	Esophageal Varices	
	Present	Absent
PC/SD ratio <909	111	8
PC/SD >909	27	34

## DISCUSSION

In our study we included 180 cases of cirrhosis and divided them according to age range. Maximum 86 patients were between 51-70 years age group, 81 cases between 31-50 years and 13 cases were <30

years of age. Out of 180 cases 90% were male and 10 % were female.

Similar study conducted by A Sarangapani et al<sup>6</sup> in 2010 and J V Cherian et al<sup>7</sup> in 2011.

In our study maximum patients of liver cirrhosis were alcoholics 43.3%, followed by viral hepatitis 16.7%, auto immune disorder 9.4%, NASH 7.7 %. (Table 2)

Similar results found by WW Baig et al<sup>8</sup> in 2008 in their study.

In our study most, common endoscopic finding was portal hypertensive gastropathy, 87.8% had portal hypertensive gastropathy and 22.7% had oesophageal varices. (Table 3)

In this study we divided the patients according to esophageal varices grading which we found endoscopically. Maximum cases in our study had grade II varices 31.7% followed by grade I varices 30.6%, grade III varices 15% while 22.7% cases had normal endoscopy. (Table 4)

Considering the PC/SD ratio cut off of 909 as suggested by Giannini et al<sup>9</sup> (which suggested 100% sensitivity and 93% specificity) in our study, we categorized our patients into two groups based on a cut-off value of 909 for platelet count/spleen diameter ratio and same was applied for evidence of esophageal varices. Based on these findings in our study we found 66.11% patients had PC/SD ratio <909 while remaining patients had PC/SD ratio >909.

In our study the sensitivity and specificity for this cut-off value. We found sensitivity of 79.8% and specificity of 80.5%.

Other similar studies which are carried out with the same ratio of 909 were compared. Baig et al<sup>8</sup> in 2008 showed cut off of 909 with sensitivity 80% and specificity of 89%. Giannini et al<sup>9</sup> in 2003 showed cut off of 909 with sensitivity 100% and specificity 93%. Sarangapani et al<sup>6</sup> in 2010 showed cut off of 909 with sensitivity 88.5% and specificity 83%.

The positive predictive value was 93.3%, but the negative predictive value was 55% as a reflection of our specificity (80.5%).

## CONCLUSION

Our results validate the diagnostic accuracy of the platelet count/spleen diameter ratio for the non-invasive diagnosis of oesophageal varices. It allowed us to identify a large number of patients with oesophageal varices and the use of the platelet count/spleen diameter ratio also safely identified patients without oesophageal varices. Applying the platelet count/spleen diameter ratio in clinical practice as part of the diagnostic workup of cirrhotic patients will go long way in decreasing the financial burden of the endoscopy unit as well medical costs related to esophageal varices screening.

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**Conflict of interest:** None Declared.

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