

Original Research Article

# The strength of association between three significant indices of Cirrhosis

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	International Archives of Integrated Medicine, Vol. 7, Issue 10, October, 2020.	
	Available online at <a href="http://iaimjournal.com/">http://iaimjournal.com/</a>	
	ISSN: 2394-0026 (P)	ISSN: 2394-0034 (O)
	Received on: 02-08-2020	Accepted on: 14-08-2020
	Source of support: Nil	Conflict of interest: None declared.
<b>How to cite this article:</b> Manoj Yadav, Srijaya S. Sreesh. The strength of association between three significant indices of Cirrhosis. IAIM, 2020; 7(10): 66-69.		

## Abstract

**Background:** Cirrhosis of liver has been a significant health care burden worldwide. Thrombocytopenia is found to be one of the associated parameters of cirrhosis. Splenomegaly is thought to be one of the main factors behind thrombocytopenia in multiple studies. So, we re-evaluated the strength of association between thrombocytopenia, MELD score and spleen size in liver cirrhosis.

**Objectives:** To evaluate the relation between thrombocytopenia, MELD score and spleen size in liver cirrhosis and to study the association between thrombocytopenia and etiology of cirrhosis.

**Materials and methods:** It was record based cross sectional study in which discharge summaries of patients with cirrhosis admitted in Medical Gastroenterology Department, Government Medical College Thiruvananthapuram were studied.

**Results:** Correlation analysis by Spearman method showed non-significant negative correlation between Platelet count and Spleen size ( $P = 0.77$ , coefficient = - 0.028). Thrombocytopenia was significantly more common among patients with cirrhosis of alcoholic etiology (83.78 %) than in other etiologies of cirrhosis (52 %) ( $P = 0.012$ ).

**Conclusion:** There is no correlation between the three major indices noting the severity in Cirrhosis, namely, Platelet count, MELD score and Spleen size in cirrhosis. Thrombocytopenia is more common in Cirrhosis caused by alcohol as compared to other etiologies.

## Key words

Cirrhosis, Thrombocytopenia, Splenomegaly, MELD Score.

## Introduction

Cirrhosis is the late stage of scarring (fibrosis) of the liver caused by many forms of liver diseases. Each time the liver is injured due to any reason, scarring occurs; simultaneously there is exuberant effort by the liver to repair itself. Cirrhosis is the final pathway for a wide variety of chronic liver diseases. Pathologically Cirrhosis can be defined as diffuse hepatic fibrosis with the replacement of the normal liver architecture by nodules [1]. Although cirrhosis is strictly speaking a histological diagnosis, a combination of clinical, laboratory, and imaging features can help confirm a diagnosis of cirrhosis.

Splenomegaly is a common finding in patients with cirrhosis and portal hypertension and is the cause of hypersplenism. Thrombocytopenia is defined as Platelet count less than 150,000/ml. Thrombocytopenia in cirrhosis is considered to have multiple etiologies.

The Model for End-stage Liver Disease (MELD) is a prospectively developed and validated chronic liver disease severity scoring system that uses a patient's laboratory values for serum bilirubin, serum creatinine, and the international normalized ratio (INR) for prothrombin time to predict three-month survival. In patients with cirrhosis, an increasing MELD score is associated with increasing severity of hepatic dysfunction and increased three-month mortality risk. Given its accuracy in predicting short-term survival among patients with cirrhosis, MELD was adopted by the United Network for Organ Sharing (UNOS) in 2002 for prioritization of patients awaiting liver transplantation in the United States [2].

## Materials and methods

### Primary objective

- To study the correlation between Spleen size, Platelet count and MELD score thereby determining the strength of association between three significant indices of Cirrhosis in the patients

admitted in Medical Gastroenterology Department of Govt. Medical College Thiruvananthapuram.

### Secondary objective

- To study association between thrombocytopenia and etiology of cirrhosis.

### Methodology

#### Study design

Record based Cross Sectional Study.

#### Study setting

Department of Medical Gastroenterology, Government Medical College Thiruvananthapuram.

### Study population

#### Inclusion criteria

- Discharge summaries of patients with cirrhosis admitted in Medical Gastroenterology Department.

#### Exclusion criteria

- Portal vein thrombosis
- Budd Chiari Syndrome
- Hepatocellular Carcinoma

### Study period

1 month from the date of getting ethical committee clearance.

### Sample size calculation

Study sample size: 112 patients.

$$N = \frac{(Z_{1-\alpha/2} + Z_{1-\beta})^2}{r^2 / 1 - r^2}$$

N: Sample size

$\alpha$ : Type I error

$\beta$ : Type II error

r: Correlation coefficient

### Sampling technique

Discharge summaries of patients of cirrhosis admitted in medical gastro department were collected from the computer system of the department where measurement of spleen size was taken in the sagittal (longitudinal) plane with the maximum dimension being recorded. MELD score and platelet levels noted from the discharge summaries.

### Ethical concern

Institutional ethical committee clearance was obtained.

### Statistical analysis

- SPSS software was used.
- Quantitative variables were expressed in Mean and Standard Deviation.
- Qualitative variables were expressed as percentage.
- Scatter plot to examine the relationship between the biomarkers for visual inspection.
- Correlation analysis was done by Spearman method.

### Results

Out of 112 patients included 75 (67 %) were males and 37 (33 %) were females. Platelet

count, MELD score and Spleen size was as per **Table – 1**.

To examine the correlation between Platelet count, MELD score and Spleen size, a scatter plot was generated for visual inspection (**Chart – 1, 2**). There was no apparent relationship between these measures.

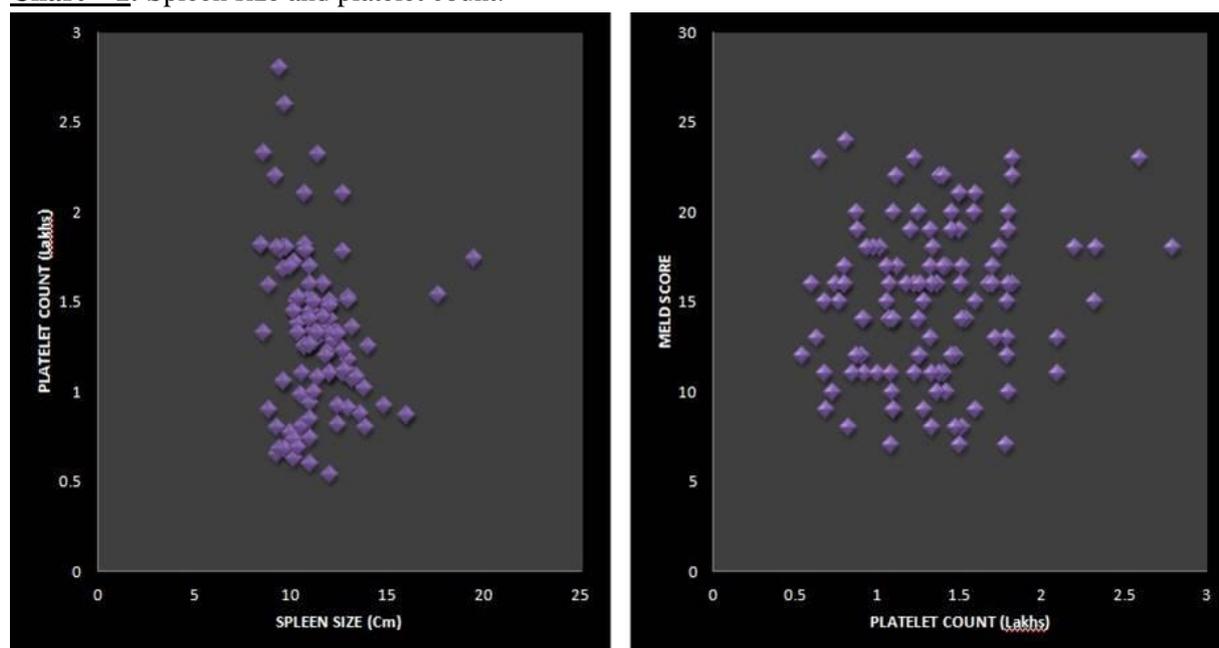
Correlation analysis by Spearman method showed non-significant negative correlation between Platelet count and Spleen size ( $P = 0.77$ , coefficient = - 0.028).

Thrombocytopenia was significantly more common among patients with cirrhosis of alcoholic etiology (83.78 %) than in other etiologies of cirrhosis (52 %) ( $P = 0.012$ ).

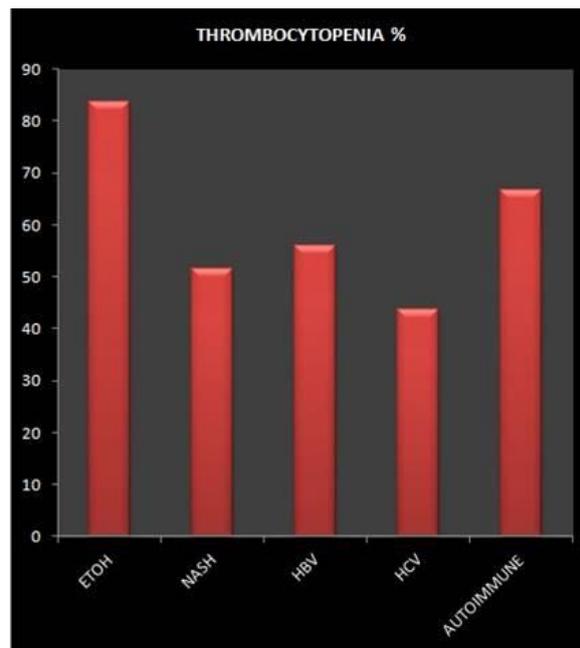
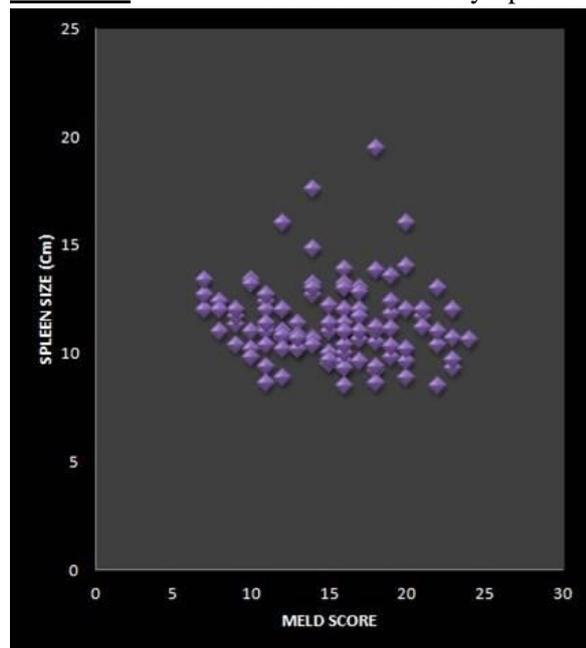
**Table – 1:** Platelet count, MELD score and spleen size.

	Platelet count (lakhs/cumm)	MELD score	Spleen size (cm)
N	112	112	112
Mini. – Max.	0.54 – 2.8	7 - 24	8.5 – 19.5
Mean (SD)	1.328 (0.427)	15.08 (4.202)	11.41 (1.786)
Median	1.32	16	11

**Chart – 1:** Spleen size and platelet count.



**Chart – 2:** MELD score and thrombocytopenia.



## Discussion

A study was done by Djordjević J, et al. in Beograd, Serbia in 2010 to investigate a correlation between the platelet count and spleen size in patients of Cirrhosis [3]. The study revealed that thrombocytopenia could be present even in the absence of enlarged spleen suggesting the involvement of other mechanisms of decreasing platelet account.

Another study was done by Mashrafi Ahmed, et al. published in blood journal in 2015 to look for correlation between spleen size, thrombocytopenia and MELD score in chronic liver disease secondary to viral hepatitis B and/or C [4]. They found that platelet count is not related to MELD score or spleen size in these hepatitis B, C, or B/C patients.

## Conclusion

There is no correlation between the three major indices noting the severity in Cirrhosis, namely, Platelet count, MELD score and Spleen size in cirrhosis. So the strength of association is weak. Thrombocytopenia is more common in Cirrhosis caused by alcohol as compared to other etiologies.

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