The Relationship of Platelet/Leukocyte Ratio with the Severity of Liver Cirrhosis Patients based on Child Turcotte Pugh Scores

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Abstract: _Background: Liver cirrhosis is the final stage of progressive liver fibrosis which characterized by distortion of the liver pcal marker of the systemic inflammatory response in liver cirrhosis. Platelet/leukocyte ratiowas used as mortality predictor in liver cirrhosis patients._ _Methods: This research is an observational with cross sectional method. The liver cirrhosis patients who were treated at RSUP.H.Adam Malik Medan were divided into A, B and C of CTP score, then were checked for the platelet/leukocyte ratio._ _Result and Discussion: Amount of 69 cirrhosis patients who were treated at RSUP H Adam Malik had met the inclusion criteria which of 53 males (76.8%) and 16 females (23.2%). There was a significant relationship between platelet/leukocyte ratioand liver cirrhosis severity (p<0.001) by Anova test. By Posthoc test, asignificant difference also found in platelet/leukocyte ratiovariable between class A and class B, class A and class C, also class B and class C (p<0.001, respectively)._ _Conclusion and Suggestion: There is a significant relationship between the platelet/leukocyte ratioand the severity of liver cirrhosis. PWR examination with CTP scores in patients with liver cirrhosis should be used as an alternative examination to predict its severity._

Keywords: Liver Cirrhosis, Platelet/leukocyte ratio, CTP score

1. Introduction

Liver cirrhosis is a chronic disease of the liver or the final stage of a progressive diffuse liver fibrosis process characterized by distortion of the liver cellular and the formation of regenerative nodules. Hepatitis B, Hepatitis C, and alcohol consumption play an important role for liver cirrhosis. Clinically, liver cirrhosis is divided into compensated and decompensated liver cirrhosis. Liver cell insufficiency and portal hypertension can causes the changingof compensated form into decompensated.[1,2]

The Platelet/leukocyte ratio(PLT/WBC) ratio refers to a hematological marker of the systemic inflammatory response. Recently, it has been validated to predict the risk of infectious complications in liver cirrhosis patient with intravenous thrombolysis and also the survival of these patients. But, the rate of the sruvival has not been explored widely.The Platelet/leukocyte ratiois easy to obtain and very cheap. Patients with HBV-associated liver cirrhosis had significantly lower platelet/leukocyte ratiovalues than healthy subjects. Decreased of it was used as an independent predictor of HBV-related mortality in patients with liver cirrhosis.[3–5] This study aimed to determine the relationship between platelet/leukocyte ratio and severity of liver cirrhosis patients based on the Child Turcotte Pugh score.

2. Methods

This research is an observational study with cross sectional data collection method. The study was conducted at the Department of Clinical Pathology, USU Faculty of Medicine / H. Adam Malik Hospital, Medan in collaboration with the Department of Internal Medicine, Gastroenterohepatology Subdivision, USU Faculty of Medicine, from January 2021 to April 2021. The research subjects were liver cirrhosis patients who had treated at H. Adam Malik Hospital, Medan, and has met the inclusion criteria. The inclusion criteria in this study were all liver cirrhosis patients and the exclusion criteria were patients whose taking anticoagulants, diagnosed by abdominal malignancy, and bacterial infections. The examination of the platelet/leukocyte ratio was carried out at the Department of Clinical Pathologyusing the automatic analyzer Sysmex XN 1000 Flowcytometry method.

3. Results

This study was followed by 69 subjects with liver cirrhosis where total of 53 subjects (76.8%) were male. Based on the CTP classification, there were 23 people in class A, 23 people in class B, and 23 people in class C (table 1).

Table 1: Subject Characteristics

Characteristics	N=60
Sex Male Female	 53 (76,8) 16 (23,2)
Hepatitis B, n (%)	
HbsAg (+)	62 (89,9)
HbsAg (-)	7 (10,1)
Anti HCV, n (%)	
Anti HCV (+)	25 (36,2)
Anti HCV (-)	44 (63,8)
Asites, n (%)	
Tidakada	23 (33,3)
Ringan	23 (33,3)

Sedang	23 (33,3)
Ensefalopati, n (%)	
Tidakada	26 (37,7)
Ringan	20 (29)
Sedang	23 (33,3)
Blood Analysis	
Platelets, 10^3/µL	
Mean (SD)	128,36 (47,62)
Median (Min – Max)	112 (55 – 258)
Leucocyte, 10^3/µL	
Mean (SD)	16,01 (7,57)
Median (Min – Max)	16,6 (4,3 – 29,95)
SGPT, µ/L	
Mean(SD)	68,43 (47,77)
Median (Min – Max)	55 (19 – 363)
SGOT, µ/L	
Mean(SD)	154,62 (121,33)
Median (Min – Max)	120 (45 – 766)
TotalBilirubin, mg/dL	
Mean(SD)	4,51 (4,43)
Median (Min – Max)	2,5 (0,7 – 16,6)
PT	
Mean(SD)	20,79 (9,94)
Median (Min – Max)	20,5 (9,94)
INR	
Mean(SD)	1,94 (0,5)
Median (Min – Max)	1,79 (1,52 – 5,56)
Albumin	
Mean(SD)	2,43 (0,62)
Median (Min – Max)	2,2 (1,5 – 3,5)
CTP Classification (Cirrhosis Severity)	
Class A	23 (33,3)
Class B	23 (33,3)
Class C	23 (33,3)

Table 2: Variable in CTP Score for Cirrhosis Severity

Karakteristik	Kelas A	Kelas B	Kelas C	P
Ascites, n (%)				
No	23 (100)	0	0	<0,001[a]
Mild	0	23 (100)	0	
Moderate	0	0	23 (100)	
Ensefalopati, n (%)				
No	23 (100)	3 (13)	0	<0,001[a]
Mild	0	20 (87)	0	
Moderate	0	0	23 (100)	
Bilirubin, n (%)				
< 2 mg/dL	23 (100)	3 (13)	0	<0,001[a]
2 – 3 mg/dL	0	18 (78,3)	1 (4,3)	
> 3 mg/dL	0	2 (8,7)	22 (95,7)	
Albumin, n (%)				
2,8 – 3,5 g/dL	23 (100)	0	0	<0,001[b]
< 2,8 g/dL	0	23 (100)	23 (100)	
PT, n (%)				
> 6 seconds	23 (100)	23 (100)	23 (100)	-
INR				
< 1,7	0	3 (13)	2 (8,7)	0,107[a]
1,7 – 2,3	23 (100)	18 (78,3)	18 (78,3)	
> 2,3	0	2 (8,7)	3 (13)	

[a]Kruskal Wallis, [b]Mann Whitney

Table 3: Analysis of Platelet/Leukocyte Ratio to Severity of Liver Cirrhosis by CTP Score

Liver Cirrhosis Severity (CTP Score)	Platelet/Leukocyte Ratio	p	Posthoc	
	Mean (SD)		ClassB	Kelas C
Class A	28,3 (7,42)	<0,001	<0,001	<0,001
Class B	6,9 (1,36)			<0,001
Class C	3,55 (0,69)			

4. Discussion

In the basic characteristics of this study, 53 male patients (78.6%) were found while 16 were female (23.2%), which is in accordance to a study conducted by Mukherjee et al 2017, where there were 38 men (66%) and 15 women (34%).[6]

From this present study, the most types of hepatitis were caused by hepatitis B in 62 subjects (89.9%) and hepatitis C in 25 subjects (36.2%). While previous studies by Wu et al showed that the risk factors for liver cirrhosis in China were mostly caused by NAFLD (49.3%), hepatitis B (22.9%), ALD (14.8%), and hepatitis C (3 ,2%). While Zhu et al in Singapore stated the etiology of HCC was mostly caused by hepatitis B (35%), followed by other causes (31.4%) and hepatitis C (13%).[7]

Table 3 shows a significant difference between the CTP (Child-Turcotte Pugh) score parameter characteristics in severity of liver cirrhosis. Based on the Child-Turcotte Pugh classification, liver cirrhosis patients were divided into three classes (A,B, and C). In this study, each classes was consist of 23 patients. It is in accordance with Bashour et al's study of 40 liver cirrhosis patients, that class B CPS was the most CPS (22 patients ;55%), 13 patients (32%) in class A, 5 patients (13%) in class C.[8] The study conducted by Tsao et al with 131 patients for a year cohort study showed the same results, namely class B CPS was the largest (72 subjects; 54.6%) 24.6% class A, and 28.8% in class C.[9] Research by Tsochatzis et al on 106 patients showed the highest number of class B patients was 64 subjects, where class A and class C respectively 28 and 14 subjects.[10]

5. Conclusion

There was a significant relationship between the Platelet/Leukocyte Ratioand the severity of liver cirrhosis (p < 0.001). PWR examination associated with CTP score in patients with liver cirrhosis should be used as an alternative test to predict the severity of patients with liver cirrhosis.

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