DETERMINATION OF ASSOCIATION BETWEEN BIO-CHEMICAL STRICTURES OF NUTRITIONAL CONDITION WITH THE SEVERITY OF THE LIVER CIRRHOSIS DUE TO HCV

[1]Dr. Kashif Saeed, [2]Dr. Shahab Rafique, [3]Dr Shajia Shabbir
[1]Medical Officer, Sheikh Zayed Medical College RYK, [2]Medical Officer, Nishtar Medical University, [3]Woman Medical Officer DHQ Hospital Layyah.

Abstract:
Objective: This research work carried out to determine the association between different bio-chemical strictures of nutritional condition with the severity of liver cirrhosis due to HCV infection in our institute.
Methodology: This was transverse research work on total two hundred and fifty nine patients suffering from liver cirrhosis related to HCV who visited the OPD of Mayo Hospital, Lahore from July 2017 to March 2019. We used the PCR for the confirmation of the HCV status. Ultrasound was used in start to establish the confirmation of cirrhosis whereas CTP score was in use for gauge of the severity of cirrhosis. The bio-chemical parameters for the nutrition condition included the LDL, ferritin, serum albumin, serum cholesterol, creatinine, calcium, sodium, potassium and magnesium. We also recorded the clinical as well as demographic data of the patients.
Results: The average age of the patients was 58.730 ± 6.040 years with 57.10% being the male patients. Mean body mass index of the patients was 22.720 ± 1.690 kg/m2. Most of the patients as 47.50% (n: 123) belonged to the group of CTP-A, 25.90% (n: 67) patients were in group of CTP-B & 26.60% (n: 69) patients in the group of CTP-C. There was significant negative associations of the severity of liver cirrhosis with the body mass index, LDL, TG, Hemoglobin level, magnesium, calcium, creatinine and albumin as identifier of malnutrition. When we carried out the analysis of bio-chemical strictures amongst the persons of all groups of cirrhosis, we come to know that there was significant negative association across the similar features in CTP-C group, whereas CTP-A was present with strong association with present parameters.
Conclusion: Considering the hindrances of the standard approaches only to evaluate the malnutrition in complication of liver cirrhosis, bio-chemical strictures are valid to support in the diagnosis of the prevailing malnutrition.
Keywords: *Strictures, hindrances, prevalence, cirrhosis, HCV, methodology, PCR.*

Corresponding author:
Dr. Kashif Saeed,
Medical Officer, Sheikh Zayed Medical College RYK.

QR code

INTRODUCTION:

The occurrence of HCV in our country Pakistan is very high and it is also one of the most important cause of liver cirrhosis [1]. The diseases of liver due to HCV is very important reason for high rate of morbidity as well as mortality [2]. Malnutrition is very common condition in the disease of cirrhosis [3]. This point is normally missed in the processes of cirrhosis monitoring [4], hence it is very important issue to be resolved [4]. This point is very important for the countries which are under developments where the incidence of the malnutrition is much high. In accordance with the guidelines of ESPEN (European Society for Clinical Nutrition & Metabolism), anthropometry is the best method to assess the malnutrition in the cases of cirrhosis [5]. A research work conducted in Brazil to assess the effectiveness of procedure of SGA and discovered the efficacy as only 28.0% [6]. Due to high rate of variations as faced by the professionals, there can be an impact on the outcome of the measures taken by anthropometry [7].

There are many bio-chemical parameters which can be used to evaluate the nutritional condition in liver cirrhosis. The identification of these parameters of the nutritional condition may cause the early discovery of the malnutrition. Port also used many bio-chemical parameters to evaluate malnutrition among patients of cirrhosis [8]. Some research works of past conducted by Ismail [9] and Naqvi [10] in our country Pakistan showed the high occurrence of the malnutrition in the liver cirrhosis. This research work aimed to find out the association between bio-chemical strictures of nutritional condition and severity of the disease of cirrhosis for the early diagnosis of malnutrition.

METHODOLOGY:

This was a transverse research work conducted on the patients suffering from liver cirrhosis due to HCV who visited the Medical OPD of Mayo Hospital, Lahore from July 2017 to March 2019. We used the non-probability method for the sampling of the patients. In accordance with the data present in this specific field, expected incidence of the malnutrition in the patients suffering from liver cirrhosis was 85.55% [10]. There were total two hundred and fifty nine patients in this research work. All the patients of this research work were present with more than 18 year of age, from both genders and they were suffering from the confirmed liver cirrhosis related to HCV. We used PCR for the identification of the presence of the hepatitis. We only included the patients with the positive report of PCR. We recorded and identified the liver cirrhosis by the past history, medical findings, parameters of laboratory testing and imaging [11]. We used the CTP (Child-Turcotte Pugh) scores for the scoring of the severity of cirrhosis from A to C [12]. Patients suffering from other serious complications were not the part of this research work. Ethical committee of the hospital gave the permission to conduct this research work. We also took the verbal consent from every patient after explaining them the purpose of the research work.

We recorded all the necessary information of the patients on a well-organized Performa. We took the blood samples and carried out the laboratory testing for bio-chemical evaluation of following ranges of parameters as serum albumin from 3.50 to 5.50 g/dl, creatinine from 0.50 to 1.50 mg/dl, cholesterol from 130 to 200 mg/dl, LDL (Low Density Lipoprotein) less than 150 mg/dl, HDL (High Density Lipoprotein) from 30.0 to 65.0 mg/dl, TG (Triglycerides) 35.0 to 170 mg/dl, Hemoglobin from 14 to 18 g/dl for males, 12 to 16 g/dl for females, ferritin (male: 30.0 to 400 ng/ml, female:13.0 to 150.0 ng/ml), sodium from 136 to 149 mEq/L, potassium from 3.50 to 5.0 mEq/L, magnesium from 1.60 to 2.50 mEq/L and calcium from 8.60 to 10.20 mg/dl. SPSS V. 23 was in use for the statistical analysis of the collected information. We used the averages and SD for the representation of the categorical variations. P-value of lower than 0.050 was the significant one.

RESULTS:

In this research work, we analyzed two hundred and fifty nine patients of liver cirrhosis. Average age of the patients in this research work was 58.730 ± 6.040 years. Among total, 57.10% (n: 148) patients were males and 42.90 (n: 111) patients were females. The mean body mass index of the patients was 22.720 ± 1.690 kg/m2. The average duration since the identification was 7.440 ± 3.760 years. There were total 47.50% (n: 123) patients the group of CTP-A, 25.90% (n: 67) in the group of CTP-B & 26.60% (n: 69) in the group of CTP-C. The data about the demography of the patients is present in Table-1, whereas average values of bio-chemical strictures for all patients of liver cirrhosis and individual groups per class of CTP are available in Table-2.

Table-I: Basic characteristics of sample data (n=190).

Characteristics	Cirrhosis Patients	
	No / Mean	% / SD
Age (in years)	58.73	6.04
Male	148.00	57.10
Female	111.00	42.90
BMI (kg/m2)	22.72	1.69
CTP, A	123.00	47.50
CTP, B	67.00	25.90
CTP, C	69.00	26.60
Ascites	142.00	54.80
Duration since diagnosis (years)	7.44	3.76
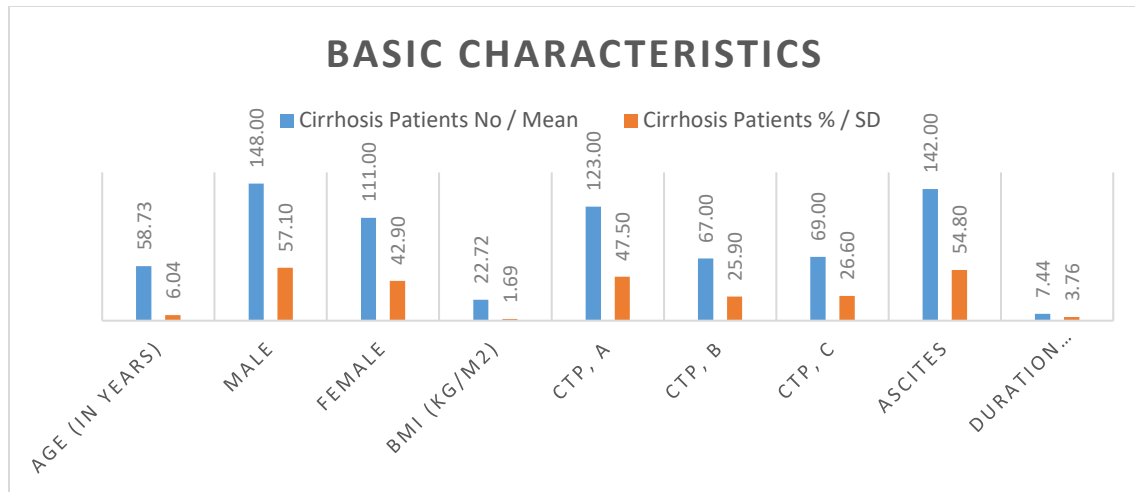
Table-II: Biochemical parameters of all cirrhosis patients and cirrhosis groups as per CTP Class.

Biochemical parameters	All Cirrhosis patients		CTP-A		CTP-B		CTP-C	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Albumin (g/dl)	3.34	0.76	4.01	0.33	3.17	0.18	2.33	0.29
Creatinine (mg/dl)	1.09	0.33	1.20	0.24	1.09	0.31	0.90	0.40
Cholesterol (mg/dl)	155.78	38.97	170.86	45.71	148.02	24.22	136.43	24.37
LDL (mg/dl)	139.99	23.46	143.74	22.51	138.49	25.87	134.75	21.77
Triglycerides (mg/dl)	137.25	26.63	144.26	27.81	131.92	23.46	129.91	24.46
HDL (mg/dl)	51.62	9.72	55.26	8.46	48.14	8.93	48.50	10.33
Hemoglobin (g/dl)	11.21	1.98	12.22	1.98	10.39	1.19	10.21	1.72
Ferritin (ng/ml)	138.58	34.27	136.39	32.94	138.98	35.75	142.11	35.53
Sodium (mEq/L)	134.90	4.03	137.78	2.80	133.53	2.50	131.10	3.15
Potassium (mEq/L)	3.96	0.32	3.96	0.28	3.90	0.29	4.02	0.40
Magnesium (mEq/L)	1.73	0.20	1.87	0.16	1.67	0.16	1.53	0.11
Calcium (mg/dl)	9.42	0.36	9.39	0.36	9.44	0.33	9.44	0.40

Biochemical Parameters of Cirrhosis Patients
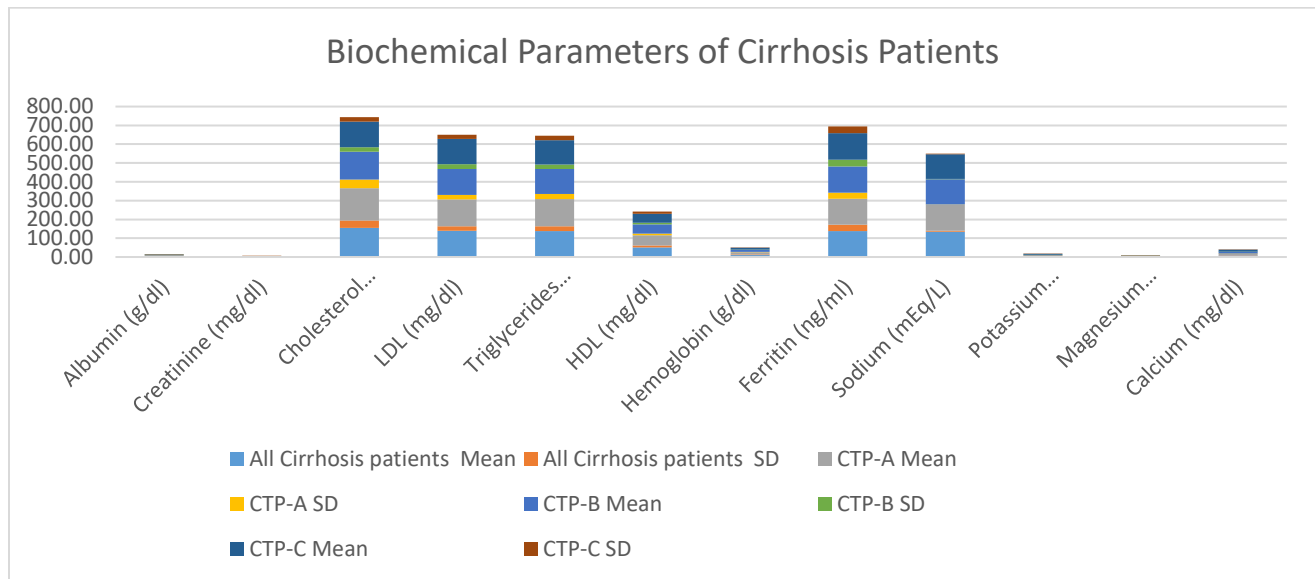
The association of the bio-chemical strictures of the malnutrition with all the patients suffering from cirrhosis and groups of individual are present in Table-3. There was significant negative associations of the severity of liver cirrhosis with the body mass index, LDL, TG, Hemoglobin level, magnesium, calcium, creatinine and albumin as identifier of malnutrition.

When we carried out the analysis of bio-chemical strictures amongst the persons of all groups of cirrhosis, we come to know that there was significant negative association across the similar features in CTP-C group, whereas CTP-A was present with strong association with present parameters.

Table-III: Correlation of BMI and biochemical parameters across all cirrhosis groups.

Parameters	All cirrhosis patients		CTP-A		CTP-B		CTP-C	
	r	p value	r	p value	r	p value	r	p value
BMI	-0.2390	0.0000	0.225*	0.0000	-0.0560	0.3600	-0.198*	0.0010
Albumin	-0.9250	0.0000	0.835*	0.0000	-0.138*	0.0200	-0.806*	0.0000
Creatinine	-0.3590	0.0000	0.303*	0.0000	-0.0060	0.9200	-0.336*	0.0000
Cholesterol	-0.3790	0.0000	0.369*	0.0000	-0.1180	0.0500	-0.3*	0.0000
LDL	-0.1630	0.0090	0.153*	0.0100	-0.0380	0.5400	-0.135*	0.0300
Triglycerides	-0.2380	0.0000	0.251*	0.0000	-0.1180	0.0500	-0.166*	0.0070
HDL	-0.3160	0.0000	0.357*	0.0000	-0.211*	0.0010	-0.193*	0.0020
Hemoglobin	-0.4510	0.0000	0.484*	0.0000	-0.245*	0.0000	-0.304*	0.0000
Ferritin	0.0690	0.2600	-0.0610	0.3200	0.0070	0.9100	0.062	0.3100
Sodium	-0.7090	0.0000	0.681*	0.0000	-0.201*	0.0010	-0.57*	0.0000
Potassium	0.0610	0.3200	-0.0050	0.9300	-0.1040	0.0900	0.109	0.0800
Magnesium	-0.6890	0.0000	0.645*	0.0000	-0.157*	0.0100	-0.573*	0.0000
Calcium	0.0620	0.3200	-0.0700	0.2600	0.0400	0.5200	0.039	0.5300

p<0.05 was considered significant.

DISCUSSION:

Malnutrition is the most important reason of the high rate of mortality in the patients with liver cirrhosis [13]. The rate of occurrence of the malnutrition in liver cirrhosis varied from 50.0% to 90.0% patients [3, 10].

According to some other research works, this complication is more common in male gender [9, 14]. Ismail in his research work stated that nutritional condition degrades as the severity of the disease increases and this similar to our results. There is

adverse impact of malnutrition in severe cirrhosis in the patients of CTP-C group [10]. There is need of more research works for the parameter of BMI with groups of change BMIs to assess the malnutrition in the patients with liver cirrhosis [6]. The decreased levels of HDL, LDL, cholesterol & TG are few parameters of cirrhosis as stated by a research work conducted in Iran [15]. One research work conducted in India discovered that there was very low level of all the variables of lipids except TG [16]. Liver cirrhosis due to HCV & HCV among patients are the main reason of the decrease in the levels of lipids even in non-availability of the cirrhosis [17]. This was an amazing fact that ferritin is an identifier of the inflammation and there is an expectation of its rise in the condition of chronic inflammation as liver cirrhosis [19]. We discovered a significant decrease in the levels of sodium & magnesium with the increase in the severity of the cirrhosis. The anomaly in the sodium level can be under expectation because cirrhosis is the main reason behind hyponatremia [20]. Nangliya stated that there is an impact on the metabolism of magnesium in cirrhosis [21]. Lastly, as according to the literature of past, creatinine & albumin were very low in this research work [8, 22].

CONCLUSION:
The bio-chemical features cannot be used separately to identify the malnutrition, they can be of supplementary worth in the patients where other evaluations like anthropometry or SGA cannot be conducted because of the restrictions. There are many benefits of the early identification of the malnutrition and it can reduce the rate of morbidity among patients suffering from liver cirrhosis.

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