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Serum Cholinesterase as a Biomarker of Liver Cirrhosis

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I. Introduction:

Hepatic cirrhosis is a clinical condition that is frequently seen. Several assays, including as serum albumin levels, PT, INR, serum bilirubin, and aminotransferases, are used in its therapy. Serum cholinesterase has been investigated as a measure of liver function in this regard since the early 1950s(1). It was discovered that serum cholinesterase originates from the liver and so represents hepatic function. It can compensate for some of the limitations of the standard liver function tests(2). For instance, albumin or fresh frozen plasma transfusions have no effect on its levels. Several studies have demonstrated that it aids in the diagnosis of liver cirrhosis as well as the evaluation of its severity and prognosis. The goal of the current investigation is to comprehend how serum cholinesterase contributes to liver cirrhosis(3).

II. Aims and Objectives:

1. To determine the serum cholinesterase concentration in cirrhotic liver patients.
2. To compare its level with that of other liver function tests, such as Child-Pugh score, PT INR, MELD, and serum bilirubin.

III. Methodology:

A prospective observational study conducted at MIMS, Nellimarla on 100 patients attending the OPD. Study has been conducted for a period of 1 year from Jan 2022 to Jan 2023.

Inclusion criteria:

Cases with liver cirrhosis that have been clinically and ultrasonographically confirmed.

Exclusion criteria:

- Carbamate and organophosphate toxicity.
- Being exposed to morphine, cocaine, codeine, and succinyl choline.
- An albumin or blood transfusion four weeks before trial enrollment.
- UGI bleed history or clinical evidence at the time of trial enrollment.
- Those with liver transplants.

The data were entered into excel sheets and analysed using Microsoft excel. Informed and written consent were taken from all the participants. This study abides by the guidelines laid by the declaration of Helsinki.

IV. Results:

The mean age of the study participants was 43.3 ∓ 4.5 years. Most cases belonged to the age group 41-50 (38%). 83% were males and 17% were females. 70 patients had alcohol as etiology, 6 had hepatitis B, 3 had hepatitis C, and remaining due to other causes. 80% had ascites, whereas 20% did not have. Of the 80, 70 had mild-moderate ascites and only 10 had severe ascites. 76% patients had icterus and 24% patients had no icterus. 66% had splenomegaly and 44% had no splenomegaly.

Bilirubin range	Frequency	%
<2 mg/dL	18	18
2-3	12	12
>3	70	70

INR range	Frequency	%
<1.7	72	72
1.7-2.3	22	22
>2.3	6	6

Child Pugh Score	Frequency	%
A	22	22
B	45	45
C	33	33

MELD score	Frequency	%
</= 15	33	33
>15	77	77

Correlation between Serum Cholinesterases and Bilirubin:

Bilirubin range	Serum Cholinesterase	*p*-Value
<2 mg/dL	4568.8	0.01
2-3	4362.2	
>3	2296.3	

In our study, serum bilirubin levels were negatively correlated with serum cholinesterase levels.

INR range	Serum Cholinesterase	*p*-Value
<1.7	3222.2	0.01
1.7-2.3	1958.6	
>2.3	1666.5	

In our study, INR levels were negatively correlated with serum cholinesterase levels.

Child Pugh Score	Serum Cholinesterase	*p*-Value
A	4636.5	0.01
B	2453.5	
C	1875.6	

In our study, Child Pugh Score levels were negatively correlated with serum cholinesterase levels.

MELD score	Serum Cholinesterase	*p*-Value
</= 15	4038.6	0.01
>15	2115.6	

In our study, MELD Score levels were negatively correlated with serum cholinesterase levels.

V. Discussion:

In our study, blood cholinesterase levels were estimated in liver cirrhosis patients and compared to other liver function tests, including serum albumin, serum bilirubin, PT INR, and Child Pugh and MELD ratings. 100 patients who had either received a clinical or ultrasonographic diagnosis of liver cirrhosis made up our study population. Together with usual tests like serum bilirubin, serum albumin, PT INR, and serum creatinine, serum cholinesterase levels were tested in all 100 individuals.

In our investigation, it was discovered that blood bilirubin levels were inversely linked with serum cholinesterase levels, with a statistically significant p value of 0.01. This is consistent with the findings of the study conducted by Jeyamani Ramachandran et al(4).

It was discovered in our study that INR value was adversely connected with serum cholinesterase values and that this relationship was statistically significant with a p value of less than 0.01. This was consistent with the findings of investigations by FanpingMeng et al(5). and Jeyamani Ramachandran, among others.

In our investigation, it was discovered that patients with Child Pugh classes C and B had lower serum cholinesterase values than patients with Child Pugh class C. With a p value of 0.01, this was determined to be statistically significant. This was in keeping with the findings of FanpingMeng et al. and M.H. Sleisenger et al(6), who found that patients with decompensated cirrhosis had lower serum cholinesterase levels than those with compensated cirrhosis.

In our investigation, it was discovered that the MELD scores and serum cholinesterase levels had an inverse correlation that was statistically significant (p value 0.01). That was comparable to the findings found by Jeyamani Ramachandran et al(4).

VI. Conclusion:

A significant inverse correlation was noted between serum bilirubin, INR, MELD score, Child pugh score, and serum cholinesterase levels.

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