



A STUDY OF SERUM CHOLINESTERASE AS BIOMARKER IN LIVER CIRRHOSIS

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ABSTRACT Hepatic Cirrhosis is one of the major causes of morbidity and mortality among Liver related disorders. Management of Cirrhosis including a battery of blood and radiological tests which include Liver function tests {serum bilirubin, serum aminotransferases, serum albumin, serum globulin} , Coagulation tests {Prothombin time, Activated Prothrombin time, INR}. Assessment of severity and prognosis of Hepatic Cirrhosis is done by various scoring systems like Child-Pugh score, MELD & Na-MELD Scores. These routinely used tests have certain shortcomings influenced with/ without therapy. Serum Cholinesterase is produced from the Liver and can be used to measure the Hepatic function unaffected by therapy. It aids both in diagnosing Liver cirrhosis and also in assessment of severity & prognosis of Liver cirrhosis. Serum cholinesterase show good correlation with routine Liver function tests, Coagulations tests and Severity scoring systems.

KEYWORDS : Cirrhosis, Cholinesterase levels, Severity scoring systems.

AIM: To estimate serum cholinesterase levels in patients with Liver Cirrhosis and compare levels with Liver function tests , Child Pugh , MELD & Na-MELD scoring systems.

OBJECTIVES:

- To study serum cholinesterase levels in patients with Liver Cirrhosis
- To compare serum cholinesterase levels with routinely used Liver function tests like serum albumin, serum bilirubin, PT, INR , Child Pugh , MELD & Na-MELD scoring systems.

STUDY DESIGN:

- Observational study
- Setting: Dept of General Medicine & Gastroenterology, Sri Ramachandra Institute of Higher Education and Research, Chennai
- Time period: 1 year[2017-2018]
- Sample size: 100 patients

INCLUSION CRITERIA: Cases diagnosed with Liver Cirrhosis clinically and by ultrasonography.

EXCLUSION CRITERIA:

- Patients with organophosphate/carbamate poisoning.
- Exposure to succinyl choline, cocaine, codeine & morphine.
- Recent albumin or blood transfusions 4 weeks prior to enrollment in study.
- Post liver transplantation.

METHODOLOGY:

After selection of patients, they are subjected to thorough history and clinical examination:

- Data collected prospectively between the months of May 2017 to october 2018. Patient demographics and clinical data will be recorded from oral questionnaires and hospital records, recorded into an excel case sheet.

2. Following investigations to be performed:

- CBC, LFTs, RFTs, PT, INR
- SERUM CHOLINESTERASE LEVELS.
- ECG & USG abdomen.

ANALYSIS OF SERUM CHOLINESTERASE:

The assay for serum cholinesterase was done using propionylthiocholine as substrate, by the kinetic propionylthiocholine method.

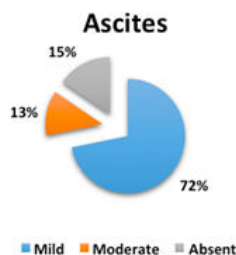
STATISTICAL METHODS:

The data was analysed using SPSS software. Pearsons correlation coefficient and p value were calculated to find the statistical significance. Variables were considered to be significant if p value <0.05.

OBSERVATIONS & RESULTS: A total of 110 subjects were included in final analysis.

- Among the 110 patients in our study, 89 patients (80.9%) were males and 21 patients (19.1%) were females.
- Majority of the subjects (73.6%) had history of alcohol intake.
- A total of 93 subjects had ascites with 79 (71.8%) subjects having mild and 14 (12.7%) subjects having moderate form of ascites. 17 (15.5%) subjects in study population had no ascites. [figure 1]
- 35-patients presented with hepatic encephalopathy, of which 12 patients were in grade I (10.9%), 14 patients (12.7%) in grade II, 9 patients (8.2%) in grade III and hepatic encephalopathy were absent in 75 patients (68.2%).
- Among the study, 10 (9.1%) subjects were positive for HBsAg and 6 (5.5%) subjects were positive for HCV. Majority of the subjects, 94 (85.5%) had negative viral markers.
- Among the study, 13 (11.8%) subjects had sonographic features of liver cirrhosis, 25(22.7%) had features of both cirrhosis and ascites. Cirrhosis and splenomegaly were seen in 9 (8.2%) subjects. Majority of subjects 63 (57.3%) had all the three features [cirrhosis, ascites & splenomegaly].
- CHILD PUGH CLASS: 26 (23.6%) subjects belonged to class A, 44 (40.0%) subjects had class B and 40 (36.4%)
- In our study, serum albumin levels were compared with the serum cholinesterase levels. It was found that the serum cholinesterase levels were lower in patients with lower values of serum albumin (positively correlated) which was statistically significant with p – value <0.01
- It was found that INR value was negatively correlated with the values of serum cholinesterase and it was statistically significant with p value <0.01.
- Serum bilirubin levels were negatively correlated with serum cholinesterase levels and the p value was <0.01 % which was statistically significant.
- In our study, it was found that serum cholinesterase values were higher among Child Pugh class A patients than class B patients, in whom the values of serum cholinesterase were higher than class C patients. Thus, higher Child Pugh grading correlated negatively with the serum cholinesterase values and it was statistically significant with p value <0.01 [table 1]
- In our study, it was found that MELD scores were inversely correlated with the serum cholinesterase levels and it was statistically significant- p value <0.01 [figure 2]

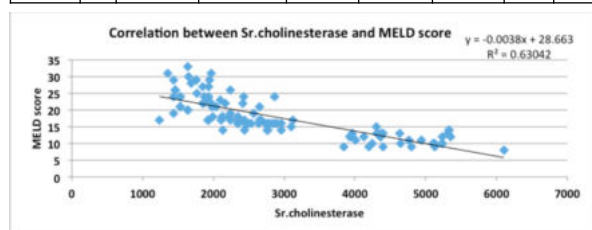
[The normal values at 37 degree Celsius: 4900 – 11900 U/L.]



Frequency of ascites in study [figure 1]

Sr.cholinesterase – Child Pugh Class [Table 1]

Child Pugh Class	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Min	Max
					Lower Bound	Upper Bound		
A	26	4737.38	586.055	114.935	4500.67	4974.10	3845	6101
B	44	2798.05	763.908	115.163	2565.80	3030.29	1852	4800
C	40	1853.53	350.858	55.475	1741.32	1965.73	1237	2649
Total	110	2912.97	1250.685	119.248	2676.63	3149.32	1237	6101



Sr.cholinesterase-MELD score [figure 2]

CONCLUSIONS:

The estimation of serum cholinesterase levels has several implications in the assessment and management of patients with cirrhosis of liver.

Serum cholinesterase activity levels have shown good correlation with the other routinely performed tests of liver function. Its assessment proves to be even more useful in settings where the commonly performed tests of liver function show abnormal results or altered values secondary to non-hepatic causes. It's a relatively inexpensive test and can be easily measured on an outpatient basis and among inpatients. Not only is it useful in the diagnosis, but its value is altered according to the liver disease severity which helps assess prognosis and further management.

Hence, estimation of serum cholinesterase routinely will prove useful in the diagnosis and management of liver cirrhosis.

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