

Evaluation of D-Dimer Level in Sudanese Patients with Chronic Liver Disease in IbnSina Hospital

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Abstract

Background: Chronic liver disease is a disease process of the liver that involves a process of progressive destruction and regeneration of the liver parenchyma leading to fibrosis and cirrhosis chronic liver disease refers to disease of the liver which had lasted over a period of 6 months. This study was conducted to evaluate the D-dimer levels among Sudanese patients with Chronic Liver Diseases. **Materials and Method:** In IbnSina hospital, Khartoum state, Sudan, a case control study was conducted. For this study, 100 participants were selected, 70 of them were patients known diagnosed by chronic liver diseases as a test group. Other 30 participants were normal healthy individual as control group. The plasma D-dimer level was measured by using MINDRAY auto analyzer BS 380). **Results:** In this study, the plasma D-dimer level has statistically significantly higher in chronic liver diseases patients (mean \pm SD 0.634 \pm 0.215 ug/l) compared to normal healthy control group (mean \pm SD 0.223 \pm 0.077 ug/l) with P value 0.000. **Conclusion:** The present study revealed that the D-dimer levels were statistically significant higher in chronic liver diseases patients.

Keywords

Chronic Liver Disease, Coagulation, D-Dimer, Sudan

1. Introduction

Hemostasis is a dynamic process resulting from the balance between procoagulant and anticoagulant factors. The liver is an important organ that synthesizes coagulation factors, (except the von Willebrand factor); fibrinolytic system proteins,

(except the tissue plasminogen factor); and the urokinase-type plasminogen activator; as well as coagulation and fibrinolysis inhibitors. In patients with hepatic parenchymal disease, the loss of functional parenchyma results in decreased synthesis of both coagulation factors and natural anticoagulant proteins.

Chronic liver disease in the clinical context is a disease process of the liver that involves a process of progressive destruction and regeneration of the liver parenchyma leading to fibrosis and cirrhosis [1].

Hemostasis is a balance between pro-coagulant and anti-coagulant forces [2]. The liver is the site of synthesis of several proteins which are involved in the process of coagulation such as prothrombin and fibrinogen [3] [4]. Liver function tests include standard laboratory tests to help in the evaluation of coagulopathy in liver disease.

The determination of prothrombin time (PT) or international normalized ratio (INR), activated partial thromboplastin time (APTT), and fibrinogen are generally carried out in order to assess the coagulation status of patients with chronic liver disease. This becomes particularly important when a patient with a history of chronic liver disease has to undergo any surgery, in order to assess the risk of bleeding. While there are several tests which assess the coagulation status tests there are no tests which are routinely carried out in order to assess the fibrinolytic status, a process which can have an impact upon the bleeding tendency of these patients. Coagulation followed by fibrinolytic activity leads to a fall in the levels of fibrinogen with a concomitant rise in the levels of fibrin degradation products [FDP's] [5].

D-dimer is a stable and measurable parameter formed by the enzymatic breakdown of the cross-linked fibrin. Estimation of D-dimer even today has been used for the diagnosis of conditions such as deep vein thrombosis and pulmonary embolism [6] [7].

Since chronic liver disease is associated with disordered hemostasis, it is possible that it could be associated not only with defects in coagulation but also of clot lysis. Estimation of D-dimer might provide some insight into possible derangements in the fibrinolytic pathway, increased D-dimer levels which is a measurable parameter for assessing the entire fibrinolytic system [8] [9].

Estimation of D-dimer even today has been used for the diagnosis of conditions such as deep vein thrombosis and pulmonary embolism [6] [10].

2. Materials and Methods

This case control study was conducted in IbnSina Hospital in Khartoum state from October 2016 to August 2017.

A total of 70 Sudanese patients with CLD were enrolled to participate in this study and 30 subjects as control group, patients included in this study were both males and females diagnosed with CLD by Liver Function Test, liver biopsy, any causes of high D-dimer levels such as DIC, heart disease, trauma, recent surgery and patients with clinical thrombosis were excluded.

About 5 mL blood sample were collected from each subject into Trisodium citrate anticoagulant containers, the plasma was separated and analysis for D. Dimer were assessed by using NycoCard Reader II, Prothrombin Time assessed by coagulometer and Albumin Level, Bilirubin Level, which were measured using ((MINDRAY auto analyzer BS 380).

This study was approved by the faculty of medical laboratory sciences, Al neelain University, Department of Hematology and informed consent was obtained from each participant before sample collection, data collection was done using questionnaire.

Data analysis was performed using SPSS (Statistical Package for the Social Science) Version 20.0 statistical software. Dependent variables, mean, standard deviation, T test, Pearson and spearman test were calculated, P values < 0.05 were considered as statistically significant.

3. Results

The mean and Standard Deviation of D-dimer in patients were 0.634 ± 0.215 ug/l and in control was 0.223 ± 0.077 ug/l, with a (P-value = 0.000) (**Table 1**). In this study, and in males mean and Standard Deviation of D-dimer were 0.646 ± 0.205 ug/l and the mean in females was 0.605 ± 0.239 ug/l with a (P-value = 0.474) (**Table 2**).

The bilirubin was measured in patients with chronic liver disease and in control and we found the mean and Standard Deviation was 2.116 ± 0.478 mg/dl and 0.703 ± 0.316 mg/dl in patients and control groups respectively with a (P-value = 0.000) (**Table 1**). The mean of bilirubin level in males was 1.250 ± 0.237 mg/dl, and the mean in females was 2.070 ± 0.444 mg/dl with a (P-value = 0.601) (**Table 2**).

Table 1. Mean concentration levels comparison of D-dimer, Albumin, Bilirubin and PT in case and control group.

Parameters	Case (M ± STD)	Control (M ± STD)	P value
D-dimer	0.634 ± 0.215 ug/l	0.223 ± 0.077 ug/l	0.000
Albumin level	1.780 ± 1.744 g/dl	4.270 ± 0.571 g/dl	0.000
Bilirubin level	2.116 ± 0.478 mg/dl	0.703 ± 0.316 mg/dl	0.000
PT	40.214 ± 9.508 sec	11.643 ± 1.275 sec	0.000

Table 2. Relationship between mean and STD of D-dimer, Albumen, Bilirubin and PT between males and females.

Parameters	Male (M ± STD)	Female (M ± STD)	P value
D-dimer	0.646 ± 0.205 ug/l	0.605 ± 0.239 ug/l	0.474
Albumin level	1.952 ± 0.039 g/dl	1.250 ± 0.237 g/dl	0.044
Bilirubin level	1.250 ± 0.237 mg/dl	2.070 ± 0.444 mg/dl	0.601
PT	40.460 ± 9.119 sec	39.600 ± 10.644 sec	0.753

Table 3. Correlation study between D-dimer and study variables.

Parameters		Albumen level	Bilirubin level	PT
D-dimer	R-value	-0.272	0.264	0.056
	P-value	0.023	0.027	0.648

In the present study, in patients with CLD, the mean and Standard Deviation of albumin level were 1.780 ± 1.744 g/dl and 4.270 ± 0.571 g/dl in control with a (P-value = 0.000) (**Table 1**). Mean of albumin in males and females was 1.952 ± 0.039 g/dl and 1.250 ± 0.237 g/dl respectively with a (P – value 0.044) (**Table 2**).

The PT was also determined giving a mean and Standard Deviation of PT in patients of 40.214 ± 9.508 seconds while in control was 11.643 ± 1.275 seconds with a (P-value = 0.000) (**Table 1**). The mean of PT in males was 40.460 ± 9.119 seconds, and mean in females was 39.600 ± 10.644 seconds with a (P-value = 0.753) (**Table 2**).

Correlation study between D-dimer and Albumen level R-value (-0.272) P-value (0.023), Bilirubin level R-value (0.264) P-value (0.027), PT P-value (0.648), R-value (0.056) (**Table 3**).

4. Discussion

In this is study, 72% of patients with CLD showed elevated in D-dimer level, when compared with control, no statistically significant differences as regard age and sex.

Our present study showed that statistically negative correlated with albumin level and positively correlated with plasma D-dimer, bilirubin level, and Prothrombin time in patients with chronic liver disease and this agree with Wesam A. Ibrahim, Sara Abdelhakam *et al.* in 2011 [11].

Our finding is in concordance with that of Agarwal *et al* who reported increased plasma D-Dimer in 63% of patients with liver cirrhosis [12].

Spadero *et al.* (2008) also reported high D-dimer level in 63% of patients with of liver disease [13].

Dhanunjaya *et al.*, J in 2013, who studied 99 patients with Chronic Liver Disease and found that was to be strongly increased significantly with severity of liver disease [14].

Turk J Gastroenterol. 2005 sep, who recruited 50 patients with CLD found that to be increased D-dimer level with cirrhotics in comparison with controls, this is Similar findings, with higher D-Dimer level had previously been reported [15].

In the current study, there was highly significantly positive correlation between plasma D-dimer and patient with chronic liver disease. This is agreed with that of Primignani *et al.* (2017) who found that D-dimer level was significantly more elevated in CLD [16].

This is study showed the correlation between D-dimer level, albumin level, bilirubin level and PT and found that, these was D-dimer inversely proportional to

albumin level and directly proportion to bilirubin level and PT.

5. Conclusion

In conclusion, the study reported the increased levels of D-dimer in Chronic Liver Disease among Sudanese patients.

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