ORIGINAL RESEARCH PAPER

Hematology

COAGULATION PROFILE IN LIVER DISEASE PATIENTS

KEY WORDS:

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ABSTRACT

Background: The liver is the corner stone of the coagulation system and the patients with liver disease are susceptible to hemorrhagic manifestations and thrombosis. Coagulation profile tests is an effective tool for making diagnosis about hemorrhagic manifestations in liver disease patients. **Objective:** Coagulation profile test in liver disease patients in tertiary care centre. A prospective 3 year study. **Material and method:** There is a prospective study done from 2019-2021 in special hematology lab in Pathology Department, G.R. Medical College Gwalior. A total of 200 patients sample were taken during this period. Samples were processed in STAGO machine for PT(prothrombin time), aPTT(activated partial thromboplastin time), INR(International Normalized Ratio) and FT(Fibrinogen test). **Result:** The most common age group affected was 41-50 years with male preponderance having male:female ratio of 3.8:1.Out of 200 cases 37% was of hepatitis, 28.5% jaundice, 21.5% alcoholic liver disease and 13% liver abscess. In almost all cases PT, aPTT, INR and FT were elevated. **Conclusion:** Coagulation profile test is a reliable and significant tool in finding coagulation disorder in liver disease patients.

INTRODUCTION

There are four major types of tests to find out any coagulation abnormality in liver disease patients- Prothrombin Time(PT), International Normalized Ratio(INR), activated Partial Thromboplastin Time(aPTT) and Fibrinogen Test(FT).[1]

In acute liver disease, the extent of coagulation abnormalities reflected most sensitively by Prothrombin time(PT), correlates well with the severity of hepatocellular damage as well as with the occurrence of abnormal bleeding and the overall prognosis, whatever is the etiology.[2]

A fibrinogen test(FT) is a test used for finding the amount of Factor I (which is soluble) and before turning of Factor I into insoluble fibrin and crosslinking to form a fibrin net. When the cascade comes to complete, the soluble fibrinogen gets converted into threads of insoluble fibrin.[3]

Activated partial thromboplastin time (aPTT) is a routine coagulation screening test that is sensitive to decline in activities of factors II, V, VIII, IX, XI, XII, kallikrein, high-molecular-weight kininogen, and reduced concentration of fibrinogen.[4]

International normalized ratio (INR) is blood-clotting test. It is a test used to measure how quickly your blood forms a clot, compared with normal clotting time.[5]

A normal INR is 1.0. Each increase of 0.1 means the blood is slightly thinner (it takes longer to clot). INR is related to the prothrombin time (PT). If there is serious liver disease and cirrhosis, the liver may not produce the proper amount of proteins and then the blood is not able to clot as it should. When your provider is evaluating the function of your liver, a high INR usually means that the liver is not working as well as it could because it is not making the blood clot normally.

OBJECTIVE

- To study coagulation profile in liver disease patients

MATERIAL AND METHOD

This prospective study was conducted in Special Hematology lab, Department of Pathology, Gajra Raja Medical College, Gwalior from January 2020 to June 2021 for a period of one and a half year A total of 200 cases were taken up for the study. The samples of patients suffering from liver diseases were collected in citrate vial for evaluation of various coagulation parameters.

Principle

For prothrombin time citrated plasma and an activating agent (usually thromboplastin extracted from animal brain) are incubated at 37°C. The plasma is recalcified and the time is measured until fibrin filaments are observed. Each laboratory has its own normal value, usually between 12 and 15 seconds. For aPTT citrated plasma, an activating agent, and phospholipid are added together and incubated at 37°C. Calcium is added, and the time necessary for the clumping of kaolin is measured.

The normal time is usually reported as less than 30 to 35 seconds depending on the technique used. In fact, there is a normal range of about 10 seconds (e.g., 25 to 35), and decreased values ("short") may also be abnormal.

Fibrinogen test is measured by the Clauss fibrinogen assay. It is a quantitative, clot-based, functional assay. The assay measures the ability of fibrinogen to form fibrin clot after being exposed to a high concentration of purified thrombin.

Plasma samples are pre-diluted which minimize assay interference from substances like heparin and fibrinogen degradation products. In brief, the diluted plasma is incubated at 37°C prior to the addition of the pre-warmed (37°C) thrombin reagent.

From the exact moment of the addition of thrombin, the time to clot is measured. The clotting time in seconds is interpolated from a standard curve made using various dilutions of assayed standard plasma.

Tesat Procedure

Blood samples from the patients will be collected and following tests will be performed:

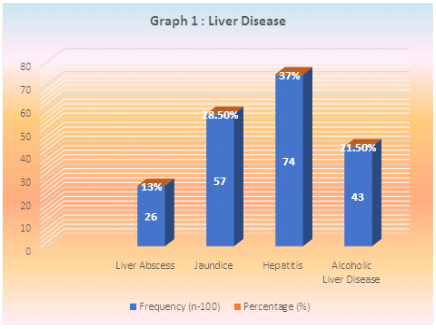
- PT- automated coagulometer by STAGO
- INR - automated coagulometer by STAGO
- aPTT- automated coagulometer by STAGO
- Fibrinogen test- automated coagulometer by STAGO

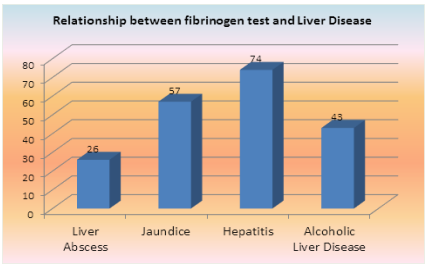
OBSERVATION

- Most of the participants were in the age group of 41-50 years (28.5%) followed by 18.5% were 31-40 years of age.
- Majority were the male (79.5%) and females were 41(20.5%).
- Mostly patients were obese (36%) followed by Overweight (29.5%)
- One third patients belong to Upper middle socioeconomic status (31%) followed by Lower middle (26%) and then followed by Upper Lower (19.5%).
- Most of the patient suffering from Hepatitis (37%) followed by Jaundice (28.5%) and then followed by Alcoholic Liver Disease (21.5%).

Results

- In the following study we have taken 200 patients in which distribution was made according to age, gender, socioeconomic status, basal metabolic index and according to the presence of liver disease.
- When we test liver disease with PT it was statistically significant with P value of 0.0001 and F value of 21.833.
- When we test liver disease with aPTT it was statistically significant with P value of 0.0002 and F value of 4.984.
- When we test liver disease with INR it was statistically significant with P value of 0.0001 and F value of 20.363.
- When we test liver disease with FT it was statistically significant with P value of 0.0001 and F value of 28.980.





DISCUSSION

In the present study, Liver disease patients had prolonged Prothrombin Time in liver disease, it is statistically significant. INR (International normalized ratio) was raised in patients with liver disease it is also statistically significant. The Activated Partial Thromboplastin Time is the test for intrinsic coagulation pathway. It is especially sensitive for factors XII, IX, XI, XIII, and platelet factor 3 adequacies. There were patients of liver diseases having prolonged Activated Partial Prothrombin Time. It is also statistically significant.

The fibrinogen test time is also elevated significantly in the patients with liver disease.

CONCLUSION

The coagulation profile was significantly altered in liver diseases.

There was a considerable variation in haemostatic parameter among the patients with liver diseases even within different groups, in which there were a insignificant prolongation in prothrombin time among the patients with liver disease (p value 0.994), and the activated partial thromboplastin time among the patients with liver disease (p value 0.002), for INR also there were a higher significant of variation among the patients with liver disease (p value 0.0001), and lastly Fibrinogen time which is also elevated in liver disease(p value 0.0001) Study of coagulation profile can help in assessing hepatic cell function and detecting cellular injury.

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