Original Article

Coagulation abnormalities in cirrhotic patients in district Bunir/Khyber Pakhtunkhwa, Pakistan

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Objective: To determine common coagulation disorders like abnormal prothrombin time/ international normalized ratio (PT/INR) abnormal activated partial thromboplastin time (aPTT), and decreased platelets count in patient with chronic liver disease (CLD).

Methodology: This study included 278 patients with CLD at Bilal Medical Trust and Hospital (BMTH) Pir Baba from January to October 2019. Bloods sample were collected in Ethylene diamine tetra acetic acid (EDTA), sodium citrate and plain vacutainer for Platelet's count, PT and aPTT. These tests were performed using hematology and coagulation analyzers respectively. PT ratio was calculated along with INR ratio.

Results: Out of 278 patients, 23 (8.3%) had normal PT (less than 15 seconds), while 255 (91.7%) had prolonged PT (more than 15 seconds). aPTT were prolonged in 245 (88%) patients. 236 (84.89%) patients had both prolonged PT and aPTT. While 164 (64%) patients had low platelets count.

Conclusion: Most of the cirrhotic patients (more than 90%) were having abnormal pictures of the coagulation and even disturbed counts of low platelets.

Keywords: HCV, coagulation, activated partial thromboplastin, platelets.

INTRODUCTION

The liver has an important role in maintaining hemostatsis as it synthesizes most of the coagulation proteins involved in fibrinolysis.[1] Impaired hemostasis resulting from abnormal liver function has multifactorial etiology like impaired coagulation factor synthesis, synthesis of coagulation factors with altered function, increased consumption of coagulation factors and altered clearance of coagulation factors.[2,3] Alterations in the system may lead to either a bleeding diathesis or thrombotic disorder.[4,5] An important contributor to the coagulation disturbances in liver disease is decreased plasma levels of hemostatic proteins synthesized by liver.[6]

The prothrombin time (PT) and its derivation, the PTR, and the commonly used 'International normalized ratio' (INR) have become the standard tests to assess coagulopathy in liver disorders.[7] Cirrhotic patients commonly present quantitative and qualitative platelet defect,[2] not accounting for volume status (portal-collateral pressure and flow), renal function, or endothelial dysfunction.[8,9] It has been noted that despite prolonged PT and aPTT, many cirrhotic patients do not experience bleeding even after liver biopsy or other potentially hemorrhagic procedures.[9] This study was aimed to determine abnormalities in coagulation profile associated with cirrhosis.

METHODOLOGY

A total of 278 Samples were collected from cirrhotic patients at BMTH. Blood samples were taken by disposable syringe and transferred it to vacutainer already contained anti coagulant trisodium citrate and also to another containing anticoagulant ethylene diamine tetra acetic acid (EDTA), and then were mixed well. An informed consent was taken from all patients.

The blood samples were analyzed for complete blood count in an automatic hematological analyzer (Sysmex KX – 21, USA). The results were given by analyzers and were noted. The normal range of PT is 10 – 14 seconds. The normal range of INR is 0.8 – 1.0. Normal range for platelet count varies from 150000 – 450000.

Statistical Analysis: The statistical analysis was performed by using SPSS 25.

RESULTS

Out of 278, 145 were male and 133 were female. Age ranged were from 10 to 95 (mean 51.9, mode 60). Out of 278 patients, 23 (8.3%) had normal PT while 255 (91.7%) had prolonged PT (Table 1). Out of 278 patients, 254 (91.4%) had INR more than 1. While out of 254 patients, 170 patients had INR of 1.1 – 2.0, which is 61% of the total 278 patients. It shows that more than 78% of patients (prolonged PT) have INR more than 3.0, the prothrombin time up to 42 seconds

(Table 2).

Out of 278 patients, 245 (88%) had prolonged APTT. Normal range varies from 28-34. Beside these, out of 278 patients, 236 (84.89%) had both prolonged PT and APTT. No significant difference was observed in coagulation profile between male and female patients.

Table 1: Frequency of patients having prolonged PT (n = 278).

PT	Number	Percent
Normal PT	23	8.3
Prolonged PT	255	91.7
Total	**278**	**100.0**

Table 2: Frequency of patients having prolonged PT/INR (n = 278).

INR	Frequency	Percent
INR 1.1 – 2.0	170	61.2
2.1 – 3.0	49	17.6
3.1 – 4.0	19	6.8
4.1 – 5.0	10	3.6
5.1 – 6.0	3	1.1
Above 6	3	1.1
Total	254	91.4
Missing Systems	24	8.6
Total	278	100.0

Out of 278 patients, 164 (59%) had low platelet count. Patients having platelet count 15000 to 20000 were 2.5% of the total low platelet count patients. 7.2% were in between 21000 – 50000 which were at high risk for bleeding after minor injury. 51000 to 75000 were 11.5%, 76000 – 100000 were 13.7%, 100001-150000 were 24.1%.

DISCUSSION

Hemostasis is a dynamic balance in cirrhotic patients.[1,10] Any disturbance in either of blood picture can disturb homeostasis and hence normal body functions too.[8-11] A total of 278 patients were selected having cirrhosis. Out of these total 278 subjects, 255 (91.7%) were having prolonged PT. APTT were prolonged in total of 245 (88%) patients. 236 (84.89%) patients were having prolonged PT and APTT. While 164 (64%) patients were having low platelets count.

One study showed that 88% of the patients had prolonged PT while 71% of cases had raised aPTT among the CLD patients and both PT and aPTT were prolonged in 67% cases.[11] If we compare our results with this then both are almost similar like our results indicate that 91% of the patients had prolonged PT while aPTT was high in 88% of the patients. Similarly, 88% of patients were having prolonged both of the PT and aPTT. A study suggested that any abnormality in liver has great and remarkable influence on coagulation pathology.[12]

Our study indicated that out of 278 patients, 254 (91.4%) had INR more than 1. This usually happens in cirrhotic patients as many studies are in support of this.[13-16] The best thing behind INR is to monitor the degree of impairment of protein synthesis[11] or to predict mortality.[15] Many studies had been done but still the limit of safety has not been set for individual clotting factor deficiencies, though the common accepted limit to maintain clotting factor deficiencies at a level of > 1%.[10]

Our study indicated decrease platelets level in 59% cirrhotic patients. Study suggested that irrespective of the nature of the disease, haemostatic derangements are common and this may include decreased plasma level of procoagulant and anticoagulant due to decreased synthesis or impaired platelet function.[1,17]

Although the percentage of prolonged PT was very high as 91% but more than 78% patients had PT less than 43 seconds INR = 3. INR = 3 is not dangerous for spontaneous bleeding but is at risk for abnormal bleeding after major trauma, major surgery or other pathological condition so will need prophylaxis before going through any surgical procedure. Patients having platelet count less than 20,000 were 2.5% at risk for spontaneous bleeding and between 21000 – 50000 were 7.2% at risk for abnormal bleeding after minor trauma or minor surgery.

CONCLUSION

We found that most cirrhotic patients (more than 90%) had abnormal pictures of the coagulation and low platelets.

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