IJPRP

Indian Journal of Pathology: Research and Practice
Volume 9 Number 2 (Part I), May – August 2020
DOI: http://dx.doi.org/10.21088/ijprp.2278.148X.9220.3

Original Research Article

The Study of Coagulation Profile in Patients of Liver Disease

Patil Amita Yatish[1], Mudholkar Vishal G[2]

[1]Consultant Pathologist, Sterling Ram Krishna Super Speciality Hospital and Accuris Diagnostics, Gandhidham, Gujarat 370201, [2]Associate Professor, Dr. Shankarrao Chavan Goverment Medical College and Hospital, Nanded, Maharashtra 431606, India.

Corresponding Author:

Amita Yatish Patil, Consultant Pathologist, Sterling Ram Krishna Super Speciality Hospital and Accuris Diagnostics, Gandhidham, Gujarat 370201, India.

E-mail: dramita163@gmail.com

How to cite this article:

Patil Amita Yatish, Mudholkar Vishal G. The Study of Coagulation Profile in Patients of Liver Disease. Indian J Pathol Res Pract 2020;9(2 Part I):21–26.

Abstract

Introduction: Liver diseases are one of the important public health problems in the world and also in India. The tremendous amount of socio economic burden caused by these liver diseases, it is necessary to study the patho-physiological changes in the coagulation and the same attempt is made to review the normal physiology of haemostasis, the role of the liver in the haemostatic system and to discuss the coagulation abnormalities that may occur in patients with liver disease in this study.

Aim: To study the coagulation profile in patients of liver disease.

Objectives:

1. To study the alteration in coagulation profile in various liver diseases which helps to evaluate the risk of bleeding in patients with liver disease.

2. To study the association of coagulation abnormality with the extent of liver disease.

3. To find out prevalence of patients admitted with liver disease.

Material and Methods: The materials for the present study included patients attending the Medicine outpatient department with liver disease may be acute or chronic and admitted in In–patient department of Medicine and I.C.U. of Dr. Shankarrao Chavan Government Medical College, Vishnupuri, Nanded a tertiary care centre.

Result: A total of 120 cases were analyzed during the study period. Alcoholic liver disease was the most common pathology amongst the study subjects (44.17%). More than 2/3rd (70%) of the patients included in the study have deranged coagulation test. The total prevalence of liver disease in the hospital was 0.67%.

Keywords: Liver disease; Coagulation; Haemostasis.

Introduction

The liver plays a major role in haemostasis, as most of the coagulation factors, anti-coagulant proteins and components of the fibrinolytic system are synthesized by hepatic parenchymal cells. Additionally, the reticuloendothelial system of the liver helps to regulate coagulation and fibrinolysis by clearing these coagulation factors from the circulation. Also the liver is a highly vascularized organ with vital venous systems draining through the parenchyma, liver diseases can affect abdominal blood flow and predispose patients to significant bleeding problems. According to the World Health

Organization, about 3% of the world's population and 1–2% population of India[1] is infected with hepatitis C virus (HCV) and that there are more than 170 million chronic carriers who are at risk of developing liver cirrhosis and/or liver cancer. More than 240 million people have chronic (long term) liver infections. Liver plays a central role in the maintenance of haemostasis. As it serves as the site of synthesis of all clotting factors and their inhibitors, liver damage from any liver disease can develop multiple coagulation abnormalities that disturb the balance between clotting and fibrinolysis. These coagulation abnormalities can predispose patients from minor localized bleeding to massive life threatening haemorrhage or thrombus formation.[2]

Impaired haemostasis resulting from abnormal liver function in liver disease are usually measured by the prolongation of global screening tests such as the prothrombin time (PT) and the activated partial thromboplastin time (aPTT).[3] The liver is the cornerstone of the coagulation system and patients with liver disease are at a substantially increased risk of both thrombosis and haemorrhage. Owing to this overlap in the haemostatic abnormalities observed in the patients of various liver diseases such as infectious and toxic hepatitis, chronic hepatitis, liver cirrhosis and many others the severity of liver dysfunction is more informative than its etiology. Prothrombin time (PT) correlates well with the severity of hepatocellular damage as well as the occurrence of the abnormal bleeding and overall prognosis. Many studies have observed that significant prolongation of PT and aPTT in the absence of significant hypofibrinogenemia suggests their importance as reliable biological markers of coagulopathies in liver diseased patients.[4] HBV and HCV together are estimated to have lead to 500 million chronically infected persons and one million deaths annually and every year, one million Indians are at risk for HBV and about 100,000 die from HBV infection. Liver cirrhosis developed in 4% to 24% of persons after 20 years of infection with HCV.[5]

Global prevalence of cirrhosis from autopsy studies ranges from 4.5% to 9.5% of the general population.[6,7,8]

Aim and Objectives

Aim: To study the coagulation profile in patients of liver disease.

Objectives:

1. To study the alteration in coagulation profile in various liver diseases which helps to evaluate the risk of bleeding in patients with liver disease.

2. To study the association of coagulation abnormality with the extent of liver disease.

3. To find out prevalence of patients admitted with liver disease.

Material and Methods

This study included patients having suspected liver pathology and ready to give consent for the study. The cases were referred from Department of Medicine and I.C.U. during the period between January 2016 to June 2017 of a tertiary care hospital. All patients attending OPD+IPD with suspected liver pathology (may be in OPD, any ward or ICUs) coagulation tests and liver function tests were carried out. The cases selected for the study were subjected to detailed history and evaluation. A routine haemogram (HB, TC, DC, platelet count) was done by fully automated 3 part differential Orphee Mythic-18 cell counter. Peripheral smear was prepared from the same sample. Coagulation studies includes tests for haemostasis PT, and APTT done by fully automated STA COMPACT Coagulometer.

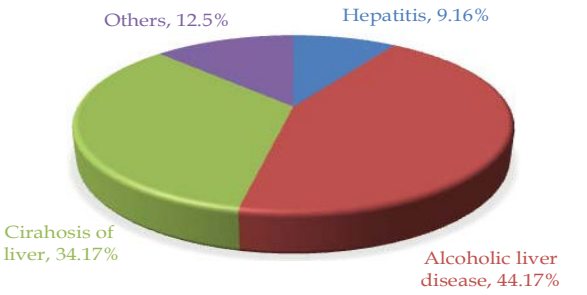
Observations and Results

The total number of patients with liver disease were 120. Thus the prevalence of cases studied was 0.67%. More than 90% of the study subjects were males while only 9 out of 120 were females in the study.

Table 1: Prevalence of liver disease amongst the patients.

Total No. of Patients in 18 Months	No. of Patients with Liver Disease	Prevalence
17886	120	0.67

Diagram 1: Distribution of Study Subjets as per Liver Pathology



Most of the study subjects were in between 41–50 years i.e in the age of 4th and 5th decade of their lives. Only 11 patients out of total 120 study subjects were less than 30 years of age while 13 were of age more than 50. Alcoholic liver disease was the most

common pathology amongst the study subjects (44.17%) while the hepatitis was the least common (9.16%). More than 70% of the patients included in the study were having deranged coagulation test i.e having at least one coagulation parameter deviated from the normality.

Table 2: Age and Sex wise distribution of study subjects in the study.

Sr. No.	Age Group in Years	Sex				Total
		Male		Female		
		Cases	%	Cases	%	
1	21–30	9	81.81	2	18.19	11
2	31–40	37	92.5	3	7.5	40
3	41–50	53	94.64	3	5.36	56
4	>50	12	92.31	1	7.69	13
Total Cases		111	92.5	9	7.5	120

Diagram 2: Distribution of Study Subjets according to Coagulation Test

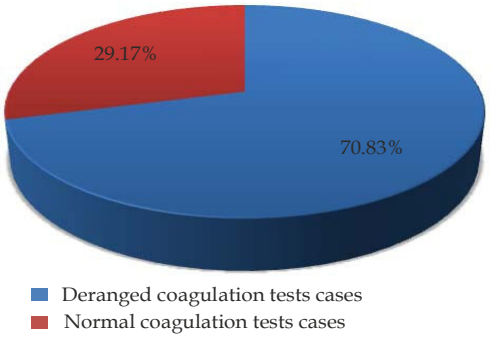


Table 3: Cases with PT & APTT derangement in Study subjects.

Sr. No.	Coagulation Parameters (Sec)	No. of Cases	Percentage
1)	Prolonged PT (>13.1)	76	63.33
2)	Mild (13.1–20)	59	49.16
3)	Moderate (21–50)	12	10.0
4)	Severe (>51)	5	4.17
5)	Prolonged APTT (>29.7)	67	55.83
6)	Mild (29.7–50)	58	48.33
7)	Moderate (51–100)	6	5.0
8)	Severe (>100)	3	2.5
9)	Both PT & APTT prolonged	56	46.67

Diagram 3: Distribution of patients as per platelet count

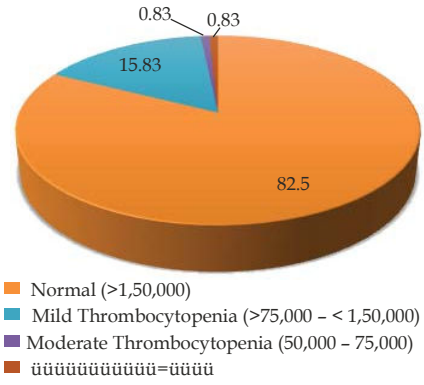


Table 4: Mean of coagulation parameters of the study subjects.

Sr. No.	Parameter	Mean + SD
1	PT (in sec)	18.507 + 11.56
2	APTT (in sec)	35.563 + 19.850
3	Platelet Count (lakh/mm^3)	2.157 + 0.796

Diagram 4: Distribution of PT among the study subjects as per liver pathology

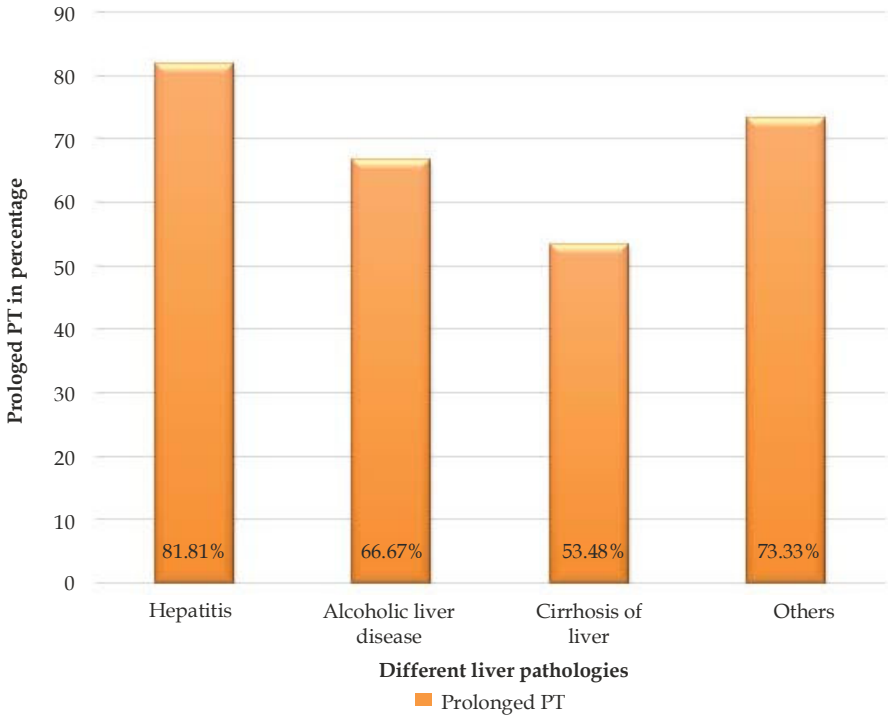
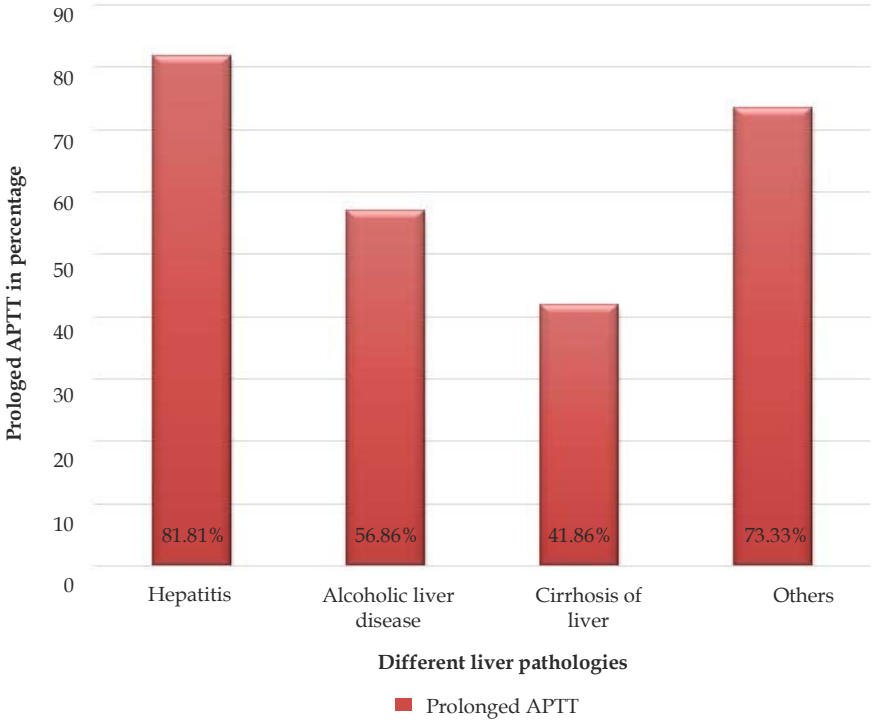


Diagram 5: Distribution of APTT among the study subjects as per liver pathology



Discussion

A cross sectional study was carried out aimed to study the coagulation profile of the patients in a tertiary care hospital. Total 120 subjects were included in the study who have given their consent and fulfilled the inclusion criteria. The parameters included in the study were platelet count, PT, APTT. According to hospital record data, total 17886 were admitted in General Medicine (Wards or ICU)during January 2016 to June 2017. Out of them 120 patients were having liver pathology and were prescribed coagulation tests. Thus the total prevalence of liver pathology cases included in our study was 0.67%.The findings for age and sex distribution are compatible with previous studies. The maximum patients were in the age group ranging from 40 to 50 years. Thus, all the patients were above 22 years. The present study age group is similar to that of Shah and Jansari[9] in which all the cases were above the age of 20 years. In the present study, sex distribution is similar to other studies, such as by Devrajani et al[10], Ahmad hameed et al[11] and Rajkumar Soloman T[12](2017)where male preponderance is seen in cases of liver diseases. The present study shows that Alcoholic liver disease was the most common pathology amongst the study subjects (44.17%) while the hepatitis was the least common (9.16%). Out of total 11 patients of hepatitis, maximum (9) were of Hepatitis B and 2 were of Hepatitis C. These findings were similar to the study by Rajkumar Solomon T et al[12] in case of proportion of hepatitis (12%) least common in the study. This finding was differing from the study by Gautam Bhatia et al[13] in 2016 involving 300 study subjects,where more than half of the patients (i.e. 156) were of cirrhosis and 75 (25%) were hepatitis while rest were include in others group. More than 70% of the patients included in the study were having deranged coagulation test i.e having at least one coagulation parameter deviated from the normality. This finding was comparable to the study by G K Tripathi et al[14] who studied coagulation profile of 311 patients out of which more than 80% of cases were having deranged coagulation profile. In the present study, 63% (76/120) patients had prolonged PT in liver diseases. The present study findings agree with the study of Malik et al[15] (66%). There were 56% (63/120) patients of liver diseases having prolonged APTT. The present study findings differing from Spector and Corn[16] study who has 39% patients with prolonged APTT. In present study 63% cases with prolonged PT, 56% cases with prolonged APTT. According to the study of Sohail Ahmed Siddiqui et al[17] (2011) has 72% cases with prolonged PT, 70% cases with prolonged APTT and thus comparable to present study. Out of total 120 study subjects platelet count was normal

in 99 patients and rest 21 were thrombocytopenic. Among the thrombocytopenic patients maximum were having mild thrombocytopenia i.e. platelet count 75000–150000/ul.Thus almost 1/5th of the patients were thrombocytopenic.This finding was differing from study of Sohail Ahmed Siddiqui et al[17] (2011) in which 36% patient were having thrombocytopenia and also from study of Gautam Bhatia et al[13] having 46% of thrombocytopenic study subjects.In the study proportion of raised PT was highest in hepatitis (81.81%) and lowest in case of cirrhosis of liver (53.48%). However the association of PT was not significant in any type of liver pathology mentioned above in the study but in a study by Sapna et al18 the PT was significantly raised in case of hepatitis. Our study states that proportion of raised APTT was highest in hepatitis (81.81%) and lowest in case of cirrhosis of liver (41.86%). However the association of APTT was significant only in cirrhosis of liver which was similar to the findings of Bikha R et al[19] and no significant association was found in other liver pathologies in the study.

Conclusion

The total prevalence of liver disease in the hospital was 0.67%. More than 90% of the study subjects were male while only 9 females out of 120 have taken part in the study. More than 2/3rd (70%) of the patients included in the study have deranged coagulation test. Alcoholic liver disease was the most common pathology amongst the study subjects (44.17%).The proportion of raised PT was highest in hepatitis (81%) and lowest in case of cirrhosis of liver (53%).However the association was not significant in any type of liver pathology mentioned above in the study. The proportion of raised APTT was highest in hepatitis (82%) and lowest in case of cirrhosis of liver (42%) and the association of APTT was significant only in cirrhosis of liver. Coagulation abnormalities were significantly associated with the extent of liver diseases. By early identification of patients at risk of bleeding, early interventional steps can be taken in the benefit of the patient. We concluded that various abnormalities of coagulation tests vary greatly with different liver disorders, duration of the disorders and their severity.

References

1. Sievert W, Altraif I, Razavi HA, Abdo A, Ahmed EA, Alomair A, et al. A systematic review of hepatitis C virus epidemiology in Asia, Australia and Egypt. Liver Int. 2011;31 Suppl 2:61–80.
2. Peck Radosavljevic M. Review article: coagulation disorders in chronic liver disease. Aliment Pharmacol Ther 2007; 26 Suppl 1:21–8.
3. Rverter JC. Abnormal hemostasis tests and bleeding in chronic liver disease: are they related? Yes. J Thrombheamost 2006;4:717–20.
4. Shah S N, Coagulation profile in liver disease–a study of 100 cases; Gujarat Medical Journal / March–2014 Vol. 69 No.1.
5. National Communicable Disease Centre, Newsletter; Vol 3: Issue 1; Page 1–4, January–March 2014.
6. Melato M, Sasso F, Zanconati F. Liver cirrhosis and liver cancer. A study of their relationship in 2563 autopsies. Zentralbl Pathol 1993;139:25–30.
7. Graudal N, Leth P, Marbjerg L, Galloe AM. Characteristics of cirrhosis undiagnosed during life: a comparative analysis of 73 undiagnosed cases and 149 diagnosed cases of cirrhosis, detected in 4929 consecutive autopsies. J Intern Med 1991;230:165–171.
8. Lim YS, Kim WR. The global impact of hepatic fibrosis and end-stage liver disease. Clin Liver Dis 2008;12:733–746.
9. Shah Shaila N And Trupti Jansari, Coagulation Profile In Liver Disease– A Study Of 100 Cases; Gujarat Medical Journal/March–2014 Vol. 69 No. 1 p37–40.
10. Devrajani BR, Ali Talpur MA, Atta-ur-Rahman A, Ali Shah SZ, Das T, Devrajani T. Coagulopathies in patients with liverc irrhosis. WorldA pplS ciJ 2012;17(1):01–04.
11. Ahmad Hameed, Samina Naeem, A. Saeed Shaikh, Irfan Khursheed, Ambreen Hamid and I. A Naveed E:/Biomedica/Biomedica Vol.22 Jan–Jun 2006/ Bio–11 (A).
12. Rajkumar Solomon T etal, A Study on Hematological Abnormalities in Chronic Liver Diseases; IOSR Journal of Dental and Medical Sciences (IOSR–JDMS) e–ISSN: 2279–0853, p–ISSN: 2279–0861. Volume 16, Issue 6 Ver. XIV (June. 2017), PP 38–44.
13. Gautam Bhatia etal, Coagulation Profile in Liver Disease– A study of 300 cases in a tertiary care hospital in Uttarakhand, International Journal of Advanced and Integrated Medical Sciences; April–June 2017;2(2):p 61–64.
14. G. K. Tripathi etal (2015) Correlation Of Coagulation Profile In Liver Disease Patients In A Tertiary Care Hospital; Int J Cur Res Rev | Vol 8 | Issue 8 | April 2016.
15. Malik AY, Amjad F, Haq S, Hayer A. Acquired coagulopathy in females suffering from acute and chronic liver diseases. Mother Child 1999 Dec;37(4):119–126.

16. Spector I, Corn M. Laboratory test of hemostasis. Arch Intern Med 1967;119(6):577–582.
17. Sohail A etal, Coagulation abnormalities in patients with chronic liver disease in Pakistan; J Pak Med Assoc. Vol. 61:363, No. 4, April 2011.
18. Sapna B, Narayan S, Gupta S, Logani KB. Coagulation profile in acute viral hepatitis. Indian J Haematol 1989;7: 110–121.
19. Bikha R etal 2012, Coagulopathies in Patients with Liver Cirrhosis; World Applied Sciences Journal 17 (1): 01–04, 2012 ISSN 1818–4952.