Original Article

Adult Patients With Liver Cirrhosis And Portal Vein Thrombosis: An Experience At A Tertiary Care Hospital

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Abstract

BACKGROUND: Portal vein thrombosis (PVT) is more common in patients with liver cirrhosis, and its prevalence increases with the severity of liver disease. PVT can lead to various complications like variceal bleeding and mesenteric ischemia. The study's main aim was to determine the prevalence of PVT in liver cirrhosis patients and ascertain its relationship with the severity of liver disease.

METHODS: After approval from the hospital's ethical committee, the study was carried out at the Department of Gastroenterology at Hayatabad Medical Complex Peshawar. One hundred and ninety-three patients with cirrhosis who met the criteria were included. All participants provided their informed consent. Patients were classified into three groups based on their Child-Pugh score. Ultrasound abdomen and Doppler ultrasound of the portal vein were done in all patients to diagnose PVT. SPSS version 25 was used for the analysis of the data.

RESULTS: A total of 193 patients were assessed. The mean age was 50.25 ± 8.56. The ratio of male to female was 2.8:1. Hepatitis C (78.2%) was the predominant etiology of cirrhosis. Most of the patients in this study had Child-Pugh Class C (43%), followed by Child-Pugh Class B (34.7%) and Child-Pugh Class A (22.3%). PVT was present overall in 13.47% of patients. The PVT frequency was higher in Child-Pugh Class C patients than Child-Pugh Class B and A patients. However, the difference in the frequency of PVT among different Child Pugh Classes was not statistically significant (p=0.202).In the same way, PVT was more prevalent in patients with cirrhosis due to underlying hepatitis C; however, the difference was not statistically significant (p=0.718).

CONCLUSION: In patients with cirrhosis, portal vein thrombosis is a common finding. Overall, 13.47% of patients in this study had PVT. PVT was observed more frequently in patients with advanced cirrhosis (Child-Pugh Class C) and those with cirrhosis due to hepatitis C. However, in our study, PVT did not have a significant association with the Child-Pugh Class, gender, or the etiology of cirrhosis.

Keywords: Portal vein, liver cirrhosis, thrombosis, portal hypertension

INTRODUCTION

Pakistan has been designated a Cirrhotic state with about ten million people with hepatitis C infection. Pakistan is ranked second globally in terms of the prevalence of hepatitis C. (1)

Cirrhotic patients are at a high risk of developing portal vein thrombosis (PVT) and every 7th patient with cirrhosis has evidence of PVT. A recent meta-analysis reported that the pooled prevalence rate of PVT in cirrhotic patients was 13.9%. However, the estimated prevalence can vary from 0.6% to 26% (2, 3). The heterogeneity in prevalence rates across different studies could be due to variations in the different parameters of participants in those studies, like age, stage of cirrhosis, and portal venous blood flow velocity. Patients with advanced liver disease (Child Pugh Class B/C) have higher rates of PVT thrombosis than those with less severe liver disease (Child-Pugh Class A). The pooled incidence rate in Child-Pugh Class B and C patients is approximately two folds (18.3%) compared to Child-Pugh Class A (9.9%) (4).

The predisposing factors for PVT can be broadly classified into local and systemic factors. (5) Cirrhosis makes the portal venous system prone to thrombus formation due to decreased blood flow caused by portal hypertension and the inflammatory milieu caused by hepatic damage and gut translocation of bacteria or their metabolites. In cirrhotic patients, hepatic architectural derangement and vasodilatation of the splanchnic system leading to portal venous stasis appear to be the most important local factor in the development of PVT. Various systemic factors such as hereditary and acquired thrombophilic disorders, hormonal therapy and malignancy also increase the risk of developing PVT. (6) Variceal hemorrhage, hyperdynamic circulation, and intestinal ischemia are all possible complications of portal vein thrombosis (7, 8). It may complicate or make liver transplants technically more difficult (9).

This study aims to assess the frequency of portal vein thrombosis in individuals with liver cirrhosis and its relationship to the severity of the disease. This research will help generate local evidence and provide a platform for further studies on this important topic.

MATERIALS AND METHODS

The descriptive cross-sectional study was conducted from August 2022 to January 2023 at the Gastroenterology Department of Hayatabad Medical Complex Peshawar after approval from the hospital's ethical committee. The sample size was 193 according to the WHO formula for sample size calculation, keeping the anticipated frequency of PVT in patients presenting with cirrhosis at 14.67%(10), a confidence interval of 95%, and a margin of error of 5%. Participants were enrolled using a non-probability purposive sampling technique.

Inclusion criteria:

Patients of either gender having aged between 20-70 Years.

Patients with liver cirrhosis irrespective of duration or etiology of

the disease. Patients were labeled as having liver cirrhosis based on clinical, biochemical, and sonographic evidence or based on their records.

Exclusion criteria:

Patients with the following conditions were excluded.

Patients with hepatocellular carcinoma or any other malignancy.

Patients having a history of venous thromboembolism or thrombophilia.

Patients having inflammatory conditions of abdominal organs like pancreatitis, cholecystitis, peritonitis, and appendicitis.

Patients having polycythemia, liver cysts, or Budd-Chiari syndrome.

Demographic details such as age, gender, body mass index (BMI), etiology of chronic liver disease (CLD), and Child-Pugh Class were noted from the records of the patients. Ultrasound Abdomen, along with a Doppler study of the portal vein, was performed by an expert radiologist. PVT diagnosis was made if there was solid endoluminal material within the main portal vein and its branches and a filling defect on the Doppler study.

SPSS version 25 was used for the analysis of the data. For numerical variables mean and standard deviation were calculated. Similarly, for categorical variables such as gender, portal vein thrombosis, and Child Class, frequencies

and percentages were calculated. Portal vein thrombosis was stratified according to age, gender, and Child-Pugh Class and etiology . Post-stratification chi-squared test was applied in which a p-value of ≤0.05 was considered significant.

RESULTS

One hundred ninety-three patients were assessed in this study. The mean age of patients in this study was 50.25 ± 8.56. Among participants in this study, male gender was predominant (73.6 %). Male to female ratio was 2.8:1. Table 1 summarizes patients' demographics and other parameters.

Table 1: Summary of Demographics and other parameters

Variables	n=193
Age (Mean ± SD)	50.25± 8.56
Body Mass Index (Mean ± SD)	24.56 ± 2.05
Gender (n, %)	
Male	142 (73.6%)
Female	51 (26.4%)
Child-Pugh Classification (n, %)	
Class (A)	43 (22.3%)
Class (B)	67 (34.7%)
Class (C)	83 (43%)
Etiology of Liver Cirrhosis (n, %)	
Hepatitis C	151 (78.2%)
Hepatitis B	27 (14%)
Other Causes (Autoimmune, Wilson, Hereditary Hemochromatosis, NAFLD PBC)	15 (7.8%)

Hepatitis C was the most common etiology of liver cirrhosis (78.2%), followed by hepatitis B (14%) and other etiologies (7.8%). Most of the patients in this study had Child-Pugh Class C (43%), followed by Child-Pugh Class B (34.7%) and Child-Pugh Class A (22.3%). Portal vein thrombosis was present in 26 (13.47%) patients. Out of 193 patients, most (71%) were in the 46-70 years age group, while 29% were in the younger 20 -45 years age group. In the elder age group (46-70 years), 19 (9.8%) patients, while in the younger age group, 7 (3.6%) were found to have portal vein thrombosis. However, portal vein thrombosis was not significantly associated with age (p=0.800).

Among 143 males in this study,18 (12.6%) males had portal vein thrombosis, whereas among 51 females, 8(15.7%) females had portal vein thrombosis; however, there was no significant association of gender with portal vein thrombosis (p=0.589).

Child-Pugh Class C patients had the highest rate of portal vein thrombosis, followed by Child-Pugh Class B and Child-Pugh Class A patients. However, the difference between Child-Pugh Classes was not statistically significant (p=0.202).

The frequency of portal vein thrombosis was highest among patients with hepatitis C as the underlying cause of cirrhosis compared to other etiologies of cirrhosis. This study did not show any significant association of etiology with the frequency of portal vein thrombosis (p=0.718)

Table 2 summarizes the association of PVT with different parameters.

Table 2 :Summary of the Association of Portal Vein Thrombosis with Different Variables

Parameter (N=193)	Portal vein thrombosis (Present)	Portal vein thrombosis (Absent)	p-Value
Age Groups (Years) 20-45 46-70	 07 19	 49 118	0.800
Gender Male Female	 18 08	 124 43	0.589
Child-Pugh Class Class A Class B Class C	 03 08 15	 40 59 68	0.202
Etiology of Cirrhosis Hepatitis C Hepatitis B Other Causes (Autoimmune, Wilson, Hereditary Hemochromatosis, NASH,PBC	 21 04 01	 130 23 14	0.718

NASH: Non-Alcoholic Fatty Liver disease, PBC: Primary Biliary Cholangitis

DISCUSSION

Portal vein thrombosis is characterized by a blood clot in the lumen of the portal vein or its branches that cause occlusion. Various conditions like cirrhosis, malignancy and myeloproliferative disorders can predispose to the development of PVT. In patients with liver cirrhosis, the prevalence of PVT is reported to be about 0.6 to 16%.(11). PVT is an increasingly identified liver cirrhosis complication, and its frequency increases simultaneously with an increase in the severity of cirrhosis(12).

In our study, PVT was found in 13.47% of patients. The results of our study are comparable to similar studies conducted by Saleem et al. and Bhatti et al., in which PVT was found in 14.67% and 15% of cirrhotic patients, respectively((10, 13).

Similarly, in another study conducted by Lankarani et al., the frequency of PVT in cirrhotic patients awaiting liver transplant was 15.9%. The slightly high frequency of PVT in this study compared to our study could be due to the fact that patients awaiting liver transplants have more advanced liver disease and are more likely to develop PVT(14).

In our study, PVT was more prevalent in patients with decompensated cirrhosis (Child-Pugh Class B and C) compared to compensated cirrhotics (Child-Pugh Class A). Similar trends have also been reported in other studies (14, 15).

Most of the patients with PVT had hepatitis C as the underlying cause of cirrhosis in our study. Saleem and his colleagues have also reported similar findings. (10). The highest prevalence of PVT was in hepatitis C-positive patients in this study which is due to the fact that 78.2% of patients in this study had hepatitis C . Similarly, in hepatitis B endemic areas, hepatitis B was found to be the frequent etiology associated with PVT(16).

Our study has a few limitations, such as a single-center study, the descriptive nature of the study , and the exclusion of certain populations, such as liver cirrhosis patients with coexisting HCC. Therefore, the authors recommend that large-scale prospective studies should be carried out to better understand PVT in patients with liver cirrhosis.

CONCLUSION

Portal vein thrombosis is a frequent finding in patients with liver cirrhosis. In our study, PVT was present in 13.47% of patients and occurred more frequently in patients with advanced cirrhosis. PVT was most commonly observed in patients with cirrhosis due to underlying hepatitis C. However, this effect is most likely due to the high prevalence of hepatitis C in Pakistan. Age, gender, Child-Pugh Class, and etiology did not have a significant association with the frequency of PVT in our study. However, patients with advanced cirrhosis (Child-Pugh Class B and C) had a high frequency of PVT compared to early cirrhotics (Child-Pugh Class A) .

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