FREQUENCY OF BICYTOPENIA IN CHRONIC HCV PRE TREATMENT CASES

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Abstract

Background: Platelets are blood cells that participate in wound healing and blood clotting. When their number decreases below 150,000/µL, this is known as thrombocytopenia. Thrombocytopenia may have no risk at all or it may lead to the risk of bleeding and thrombosis. To the best of our knowledge, no study has been undertaken on the frequency of bicytopenia in chronic HCV pretreatment cases in our local population.

Objective: The objective is to investigate the occurrence rate of bicytopenia among chronic Hepatitis C Virus patients prior to treatment within our community.

Methodology: A cross-sectional study was carried out in the General Medicine department at Hayatabad Medical Complex in Peshawar spanning from May 5th, 2022, to November 5th, 2022. The study included a total of 103 patients of both genders who were suffering from the chronic hepatitis C virus. The Sysmex Analyzer was used to measure the complete blood count. For an exact count of platelets, a peripheral smear was used. Data regarding bicytopenia was noted as per the operational definition and recorded.

Results: On average, the patients included in this study were 45.980 years old with a standard deviation of 6.73 years, and they had been dealing with HCV for an average duration of 21.359 months with a standard deviation of 6.34 months. Bicytopenia was observed in 21.4% of patients.

Conclusion: HCV patients show a high frequency of bicytopenia, indicating a significant association.

Keywords: Chronic hepatitis C virus, Bicytopenia, Frequency

Introduction

Platelets are blood cells that participate in wound healing and blood clotting (1). The normal number of platelets in human blood ranges from 150,000/µL to 450,000µL. When this number decreases below the lower limit of normal, i.e. 150,000µL this is called thrombocytopenia. Thrombocytopenia may have no risk at all, or it may lead to a risk of bleeding and thrombosis. When the number of platelets decreases below 10000/µL, then spontaneous bleeding may occur, and when their count is below 50000/µL, surgical bleeding may occur (2).

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In conditions like disseminated intravascular coagulation (DIC), heparin-induced thrombocytopenia (HIT), thrombotic microangiopathy (TMA), antiphospholipid antibody syndrome (APS) and paroxysmal nocturnal hemoglobinuria (PNH), thrombocytopenia may lead to thrombosis (3).

When the number of either of the cellular components of blood i.e. red cells, platelets, or white cells decreases below the normal, this is called peripheral cytopenia. Bicytopenia is the decrease in any two cell lines. When all three cell lines i.e. platelets, red cells, and white cells decrease it is called pancytopenia (4).

The diagnosis of Hepatitis C virus (HCV) infection involves identifying antibodies against the recombinant HCV polypeptide and performing HCV RNA assays. (5). Enzyme immunoassays are used to detect antibodies targeting NS4, core, NS3, and NS5 sequences. However, to distinguish between ongoing and past infections in individuals with HCV antibodies, detecting HCV RNA becomes essential since antibodies alone cannot differentiate between current and previous HCV infections (6). Rapid HCV antibody tests can serve as a crucial public health asset in

unconventional healthcare environments. Here are three scenarios where it's advisable to prioritize the HCV RNA test initially: 1. an immunocompromised host; 2. exposure within the past six months; 3. suspicion for reinfection (7).

In a study conducted by Rehman and colleagues, it was found that 22% of patients diagnosed with chronic hepatitis C prior to treatment exhibited bicytopenia (8).

While pancytopenia has received significant attention in research, bicytopenia remains relatively underexplored in medical literature. Few studies have delved into the various causes of bicytopenia. Understanding these causes can serve as a valuable tool for physicians, aiding in early disease detection and accurate diagnosis. As far as we know, there hasn't been any research conducted on the prevalence of bicytopenia among chronic HCV patients prior to treatment within our local community. This study aimed to investigate the occurrence rate of bicytopenia in chronic Hepatitis C virus patients before initiating treatment in our local population.

Methodology

This cross-sectional study took place in the General Medicine Department at Hayatabad Medical Complex (HMC) in Peshawar from May 5th, 2022, to November 5th, 2022. The sample size of 103 was determined using WHO sample size software, with a 95% confidence interval, an 8% margin of error, and an expected frequency of bicytopenia at 22% among chronic HCV pretreatment cases. The study employed a non-probability consecutive sampling technique.. All males and females between the ages of 20 and 70 years who were suffering from chronic hepatitis C were included in the study. Those who had a history of pancytopenia or isolated cytopenia were excluded from this study.

After obtaining approval from the ethical committee, patients who met the inclusion criteria were selected from the Department of General Medicine at HMC Peshawar to participate in the study. Baseline demographic information of patients (age, gender, and duration of HCV) was taken. All patients or their caregivers provided informed consent, guaranteeing confidentiality and emphasizing the absence of risk for the patient in participating in this study.

Platelet counts were obtained using the Sysmex analyzer as part of a complete blood count, and a peripheral smear was performed to determine the precise platelet count. Information concerning bicytopenia was documented based on the operational definition and recorded on a custom-designed form.

Here’s a unique version: "The data collected were entered into the statistical analysis software (IBM-SPSS version 25) for analysis. Categorical variables such as gender and bicytopenia were analyzed to compute frequencies and percentages. Quantitative variables like age and duration of HCV were presented as mean ± standard deviation (SD). Bicytopenia data were further stratified based on age, gender, and duration of HCV. A post-stratification chi-square test was utilized, with statistical significance set at $p \leq 0.05$.

Results

Among the 103 patients included in the study, 65% were male and 35% were female. The age of the patients ranged from 20 to 70 years, with an average age of 45.980 years and a standard deviation of 6.73 years. The mean duration of HCV among these patients was 21.359 months with a standard deviation of 6.34 months. Bicytopenia was observed in 21.4% of patients.

The stratification of bicytopenia with respect to age, gender, and duration of HCV is shown in Tables-I, II, and III respectively.

Table-I: Stratification of Bicytopenia with respect to age			
Age (years)	**Bicytopenia**		**p-value**
	Yes	No	
20-50	20(25.3%)	59(74.7%)	0.075
51-70	2(8.3%)	22(91.7%)	
Total	22(21.4%)	81(78.6%)	

Table-II: Stratification of Bicytopenia with respect to gender			
Gender	**Bicytopenia**		**p-value**
	Yes	No	
Male	10(14.9%)	57(85.1%)	0.030
Female	12(33.3%)	24(66.7%)	
Total	22(21.4%)	81(78.6%)	

Table-III: Stratification of Bicytopenia with respect to duration of HCV			
Duration of HCV (months)	**Bicytopenia**		**p-value**
	Yes	No	
1-24	3(4.8%)	60(95.2%)	0.000
>24	19(47.5%)	21(52.5%)	
Total	22(21.4%)	81(78.6%)	

Discussion

It's estimated that between 60% to 85% of individuals infected with hepatitis C virus develop chronic liver disease, highlighting its significance as a global health and socioeconomic concern (9). Bicytopenia stands out as the prevailing hematological abnormality observed in patients with chronic hepatitis C infection (10).

Our research showed that 21.4% of patients diagnosed with chronic hepatitis C virus infection exhibited bicytopenia. In contrast, a study conducted in 2012 at all medical units of Civil Hospital Karachi reported a bicytopenia frequency of 53% (defined as a platelet count below 150,000 cells/microliter), particularly prevalent among individuals aged over 60 years (9). According to a study conducted at Benazir Bhutto Hospital in the Department of Hematology in 2010, which showed bicytopenia in 25% of patients with hepatitis C virus infection (11). Our findings were in line with a study from the Department of Hematology at Sheikh Zayed Hospital in Lahore, indicating that bicytopenia is a prevalent complication among patients with chronic liver disease caused by hepatitis C, with a frequency of 22.6%. (12).

A study conducted by Louie KS et al. yielded comparable outcomes, highlighting a direct

correlation between the severity of bicytopenia and liver parenchymal damage along with fibrosis progression. Moreover, a systematic review of patients with chronic HCV infection revealed an average bicytopenia prevalence of approximately 24% (13). Bano S et al. reported that 43.3% of patients diagnosed with chronic hepatitis C virus exhibited bicytopenia(14). Bhenava B et al.'s study conducted in Tehran found that the occurrence of bicytopenia was 13.3% (15).

Several studies have identified varying mechanisms contributing to the development of bicytopenia in chronic HCV patients. These mechanisms include platelet sequestration in the enlarged spleen (16), autoimmune responses targeting platelets (17) and direct platelet infection (18). Espanol I et al. conducted a study indicating that 10.2% of individuals diagnosed with hepatitis C virus infection exhibited bicytopenia (19).

Conclusion

The notable frequency of bicytopenia among patients with HCV infections underscores the importance of vigilant monitoring during their management, particularly focusing on regular platelet count assessments.

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