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**ORIGINAL ARTICLE**

# Mean Platelet Volume in Cirrhotic Patients with Ascitic Fluid Infection

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## ABSTRACT

**Introduction:** Ascites is the most prevalent clinical symptom of cirrhosis and hepatic decompensation. Patients with cirrhosis are often more likely to get bacterial infections, particularly ascitic fluid infection, which affects 15-20% of people with ascites and cirrhosis

**Objective:** To determine mean platelet volume in cirrhotic patients with ascitic fluid infection.

**Material and methods:** The current study was descriptive and cross-sectional carried out at the department of Medicine Lady Reading Hospital Peshawar for duration of six months from January 2022 to July 2022. From all the patients, a 10cc blood and 20cc ascitic fluid was obtained under aseptic conditions and was sent immediately to hospital diagnostic laboratory for measurement of MPV from blood and Poly-morphonuclear cells in the ascitic fluid. Data analysis was done by employing SPSS version 17.

**Results:** In the current study, male patients were 129(62%) while female patients were 79(38%). The mean age (±SD) in the current study was 42 (±1.88) years. Based on platelet volume, 46(22%) patients had platelet volume range from 7.6- 8.5 fl, 100(48%) patients had platelet volume range 8.6- 9.5 fl, 62(30%) patients had platelet volume range 9.6- 11.5 fl. Mean platelet volume was 9.12 fl with SD ± 1.21.

**Conclusion:** Our study concludes that MPV levels increase significantly in cirhhotic patients with ascitic fluid infection therefore MPV measurement might be thought of as an accurate diagnostic tool for predicting ascitic fluid infection.

**Keywords:** Mean platelet volume; cirrhotic patients; ascitic fluid infection

## INTRODUCTION

Ascites is the most prevalent clinical symptom of cirrhosis and hepatic decompensation. Patients with cirrhosis are often more likely to get bacterial infections, particularly ascitic fluid infection, which affects 15-20% of people with ascites and cirrhosis [1-3]. The polymorphonuclear cell (PMN) count of the ascitic fluid collected by paracentesis must be 250/mm$^3$ in order to diagnose ascitic fluid infection. It is not necessary to separate more than one pathogen from bacterial cultures. The diagnosis of an ascitic fluid infection is not excluded by negative bacterial cultures. According to the findings of a bacterial culture, ascitic fluid infection includes neutrocytic ascites and spontaneous bacterial peritonitis. Despite the early start of antibiotic treatment, which could in most instances provide a satisfactory response, the death rate is still quite high at 30 to 50% [4, 5]. Because of this, early detection of inflammatory activity is essential for diagnosing ascitic fluid infection and modifying treatment.

Platelets make and release a lot of substances that are important for blood clotting, inflammation, blood clots, and atherosclerosis. The significant function of platelets in the atherothrombotic pathway has been underscored by the documented effectiveness of antiplatelet medications to prevent cardiovascular complications [6]. In the pathogenesis of coronary heart disease, elevated average platelet volume is a key factor. Platelet stimulation is exacerbated by insulin resistance, [7] and the markers of thrombotic potential and risk variables for micro vascular problems in diabetics include the Mean platelet volume (MPV) and platelet counts [8, 9].

Small platelets are less metabolically and enzymatically active than large platelets, which are known to be linked to inflammation [10].

In contrast to smaller platelets, those with a greater average platelet volume are both more metabolically and enzymatically active. This makes mean platelet volume one of the most frequently effective surrogate markers of platelet aggregation [11].

In various illnesses, like rheumatoid arthritis, Alzheimer's disease, inflammatory bowel disease, celiac disease and acute pancreatitis, it has been established that mean platelet volume reflects the degree of inflammation and the severity of the disease [11-13].

In order to measure platelet function and activation, the mean platelet volume has been suggested. The mean platelet volume is provided by the CBC (Complete blood count) report generated by CBC analyzer [12]. A previous study observed significant increase in MPV level in cirrhosis patients having ascitic fluid infection. They observed a mean (SD) level of MPV as 8.79 (±1.01) [14]. Another study also reported that in comparison to non AFI patients, a significant increase in MPV level occur in cirrhotic patients having AFI. The observed that the mean (SD) MPV in patients with cirrhosis having ascitic fluid infection was 8.98 (±0.9) [15].

The goal of the current investigation was to identify the MPV in patients with cirrhosis who presented with an infection of the ascitic fluid. In cirrhotic individuals, mean platelet volume may be a reliable indicator of ascitic fluid infection. In this regard, the goal of the current research was to determine if MPV may be used to predict the severity of the systemic inflammatory response in cirrhotic patients presented with ascitic fluid infection. Determining inflammatory activity early is essential for assessing the ascitic fluid infection and modifying the course of therapy since delaying effective treatment may lead to a poor outcome.

## MATERIAL AND METHODS

The current study was descriptive and cross-sectional carried out at the department of Medicine Lady Reading Hospital Peshawar. The duration of study was six months from January 2022 to July 2022. The calculated sample size was 208 by using WHO calculator for sample determination, the mean platelet volume (MPV) = 8.98 ±.09[16] with absolute precision = 1.3% and relative precision = 1.4% and confidence interval = 95%. The inclusion criteria for our study were all the all patients, both males and females with cirrhosis and ascites irrespective of the cause, having age above 25 years and below 65 years whereas the exclusion criteria were patients with Chronic kidney disease orhepatorenal syndrome, patients with previous cerebrovascular event on history, heart failure patients, patients with diabetes mellitus, hyperlipidemias, hypertension and peripheral vascular disease,

Immunocompromised patients with any hematological malignancy or neoplasia and patients who received antibiotics, anticoagulants and non-steroidal-anti-inflammatory drugs prior to admission in hospital. Approval from the research and ethical committee of the hospital was taken before sampling and then inform consent was signed from all the included patients.

Patients were admitted in ward from OPD and detailed history and clinical examination was obtained. From all the patients, a 10cc blood and 20cc ascitic fluid was obtained under aseptic conditions and was sent immediately to hospital diagnostic laboratory for measurement of MPV from blood and Poly-morphonuclear cells in the ascitic fluid. All information was recorded in a Performa. Data analysis was done by employing SPSS version 17. Variablessuch as MPV in asitic fluid infection were measured as mean and standard deviations while variables like gender were calculated as frequencies and percentages.

## RESULTS

In the current study, totally 208 patients were enrolled who fulfill the inclusion criteria. Based on gender distribution males patients were 129(62%) while female patients were 79(38%). (Figure 1) The mean age (±SD) in the current study was 42 (±1.88) years. The number of patients in age group 25-35 years, 36-45 years, 46-55 years and 56-65 years were 21(10%), 56(27%), 69(33%) and 62(30%) respectively. (Figure 2)

Based on platelet volume, 46(22%) patients had platelet volume range from 7.6- 8.5 fl, 100(48%) patients had platelet volume range 8.6- 9.5 fl, 62(30%) patients had platelet volume range 9.6- 11.5 fl. Mean platelet volume was 9.12 fl with SD ± 1.21. (Figure 3)

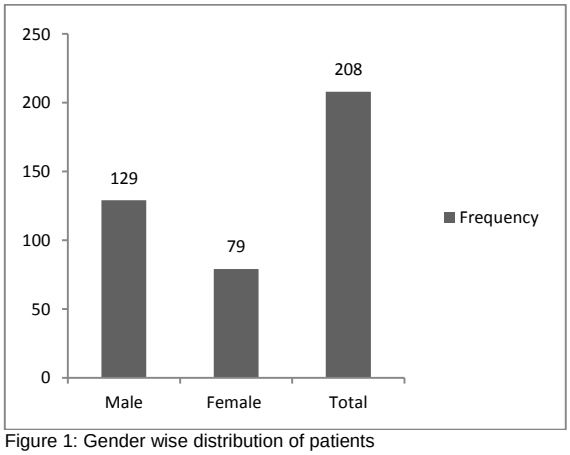


Figure 1: Gender wise distribution of patients

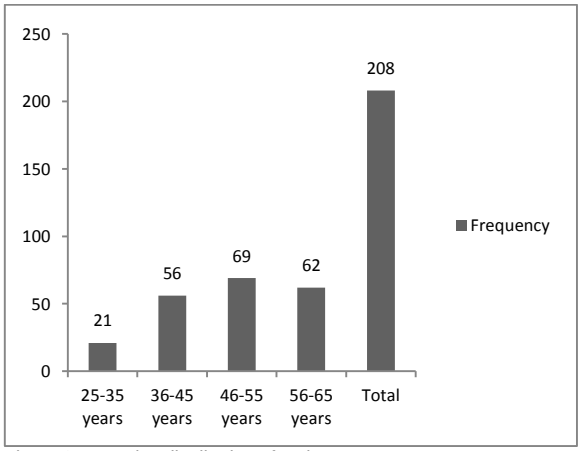


Figure 2: Age wise distribution of patients

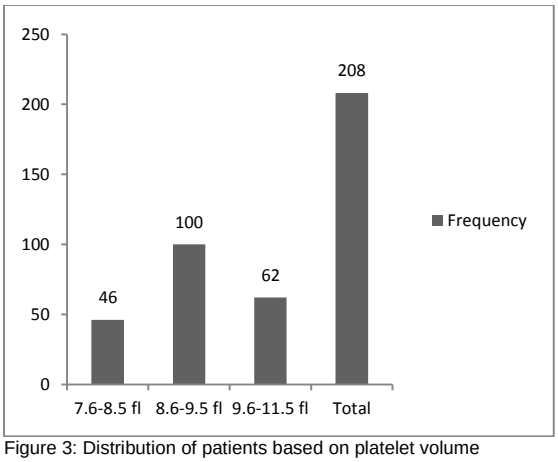


Figure 3: Distribution of patients based on platelet volume

## DISCUSSION

One of the most prevalent and serious complications of liver cirrhosis is fluid ascites infection. The gold standard for diagnosing fluid ascites infection is diagnostic paracentesis often accompanied with side effects include bleeding, local infection, visceral perforation and persistent leak following paracentesis. Simple, quick, noninvasive, and affordable diagnostic procedures are thus required for the early detection of fluid ascites infection in cirrhotic patients [16, 17]. Numerous tests have been shown to be helpful in the diagnosis of ascites infection by research. pH test, leukocyte esterase reactive strips, the lactoferrin level in ascites fluid, and the procalcitonin levels in both the ascites fluid and serum are a few examples of the diagnostic test. The majorities of these tests are expensive and are performed for research [18]. It is well recognized that platelets play significant roles in the development and progression of inflammatory and vascular disorders. The average platelet volume is recognized as a crucial factor in determining platelet activation. Small platelets are less metabolically and enzymatically active than large platelets, which are known to be linked to inflammation [19, 20].

In the current study, totally 208 patients were enrolled who fulfill the inclusion criteria. Based on gender distribution males patients were 129(62%) while female patients were 79(38%). The mean age (±SD) in the current study was 42 (±1.88) years. The number of patients in age group 25-35 years, 36-45 years, 46-55 years and 56-65 years were 21(10%), 56(27%), 69(33%) and 62(30%) respectively. Based on platelet volume, 46(22%) patients had platelet volume range from 7.6- 8.5 fl, 100(48%) patients had platelet volume range 8.6- 9.5 fl, 62(30%) patients had platelet volume range 9.6- 11.5 fl. Mean platelet volume was 9.12 fl with SD ± 1.21.

In the current study it was observed that MPV increases significantly in patients with cirrhosis having ascitic fluid infection. In accordance with our findings, a previous study also observed significant increase in MPV level in cirrhosis patients having ascitic fluid infection. They observed a mean (SD) level of MPV as 8.79 (±1.01) [14]. Another study also reported comparable results to our findings. They reported that in comparison to non AFI patients, a significant increase in MPV level occur in cirrhotic patients having AFI. The observed that the mean (SD) MPV in patients with cirrhosis having ascitic fluid infection was 8.98 (±0.9) [15].

In accordance with the current study, a previous study carried out by Suvak B et al. reported that MPV levels significant increase in cirrhotic patients having AFI in comparison to cirrhotic patients with non-AFI. They draw the conclusion that individuals with AFI who have cirrhosis have higher MPV. Due to a persistent systemic inflammatory response, MPV measurement might be thought of as an accurate diagnostic tool for predicting AFI [21].

According to a research by Razik A, platelet size changes and platelet indices may help predict ascitic fluid infection (AFI) in

cirrhotic individuals [22]. Patients with cirrhosis who have AFI had elevated platelet indices and C-reactive protein levels. Due to a persistent systemic inflammatory response, mean platelet volume (MPV) assessment may be regarded as a reliable diagnostic tool for predicting AFI.

## CONCLUSION

Our study concludes that MPV levels increase significantly in cirhhotic patients with ascitic fluid infection therefore MPV measurement might be thought of as an accurate diagnostic tool for predicting ascitic fluid infection.

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