

## Evaluation of Hematological Parameters In Patients With Hepatitis B virus

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### ABSTRACT

**Background:** Hepatitis refers to an inflammation of the liver and caused by numerous factors , such as alcoho, obesity also can be occur by viruses such as hepatitis viruses (A,B,C,D) . Determine of some haematology parameters of hepatitis B- virus in patients is the purpose of this study. All data was collected from 100 persons, divided into two grou:s:patients and control. The medical information about the patients tnclude age, gender and duration in hospital. The HbsAg for all participants persons is detect by using the enzym-linked immune sorbent assay (ELISA) and devided the postive group into acute stage and chronic stage by special doctors. All parameters indicate by complete blood count in Haematology Analyzer , including white blood cells (WBC), lymphocyte cells (LYM), red blood cells (RBC) hemoglobin (HGB), plateletes (PLT)and mean platelet volume (MPV) . The Results show pateints with hepatitis B- virus infection show changing in the levels of parameters that using in this study compared with healthy controls

**Keywords:** Hepatitis B- Virus , WBC, LYM, RBC , HGB , PLT and MPV

### Article Information

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### INTRODUCTION

The term "hepatitis" refers to an inflammation of the liver , caused by numerous factors, such as pharmaceutical, alcohol, pollutants, and certain disease . on the other words, hepatitis is an infectious can be accur by some viruses [1]

A,B,C,D and E are five virus kinds that cause viral hepatitis disease ; Hepatitis B- virus is most commom and is more lethal of all . Whereby , 1.34 million infection of HBV were reported globally in 2015 [2,3]. And about 57 million people worldwide have HBV infection , human who have the HBV can develop both acute and chronic disease. [4,5].

HBV infections in people can range from an unclear form to clinically condition, which can development from an acute state to

improveing, with permanent immunity, or to the chronic form. The symptoms and signs of infection development ranging according to age group, practically absent in newborns, but in grownups are lightly more notable (33-50%) of states, with the severity varying from mild to fulminant [6].

The infection is spread through contaminated Blood vessels, mucous membranes, or other body fluids and skin. The virus can be present in all fluids of humans body , but the concentrations of virus are greatest in serous exudate and blood, while comparatively low in sperm , vaginal secretions and saliva [7].

In general , Clinical symptoms for the disease can range from mild signs like malaise , jaundice and diarrhea to sever signes like

liver failure or death for up six months through this period [8].

The complete blood count (CBC) that have unique for determen of haematological parameters such as white blood cells, lymphocyte, red blood cells, hemoglobin, plateletes and mean cell volume [9]

Due to the prevalence of viral hepatitis, especially HBV in various age groups , severity of disease and some liver illnesses accompany with HBV stages, including the acute stage and chronic stage. Therefore, different levels of haematological markers may result. Consequently, the purpose of the study is detect the quantities of white blood cells, lymphocyte , red blood cells, hemoglobin, platelets and mean platletes volume.

**METHODS**

**Participants**

Blood samples were obtained for 100 persons . 50 sample for people having acute and chronic HBV infection have been diagnosed by a hepatologist based on their symptoms of infection (for more than six months) and 50 samples are collected as control .

**Detection of HBSAg by ELISA**

Used ELISA technique to detect the surface antigen for hepatitis B virus for all specimens in the study .

**Evaluation of Haematological parameters**

All CBC analyses were performed in the hematology laboratories in the tranfer diseases unit / AL-Sadr hospital in Najaf district / Iraq . the determination of WBC, LYM,RBC, HGB , PLTand MPV in blood were done by (Abacus 380 hematology analyzer ) within 2 hours after collecting the blood .

**Statistical analysis**

All study parameters were reported as mean and standerd deviation (SD) with lower and higher 95% confidence interval for all data .The t-test was used to determine if there was a significant difference between the two groups hepatitis viral patients and controls and the probability values were less than 0.05. All results of the statistical analysis has been done by using the statistical package for software's version (26) (SPSS).

**RESULTS**

**Participants :** The medical information collected for the persons from whom samples were taken are shown in (Tables 1,2) including age , gender , duration of hospitalization

**Table 1 / Information for infect and health people**

Particepants	Controls (mean ± SD)	patients (mean ± SD)
Age	33.64 ± 12.87	36.22 ± 14.64
Gender	24 male / 26 female	26 male/ 24 female
Duration Of Hospitalization	Not found	4.58 ± 2.87

**Table2: Distribution of patients acording to gender and age group**

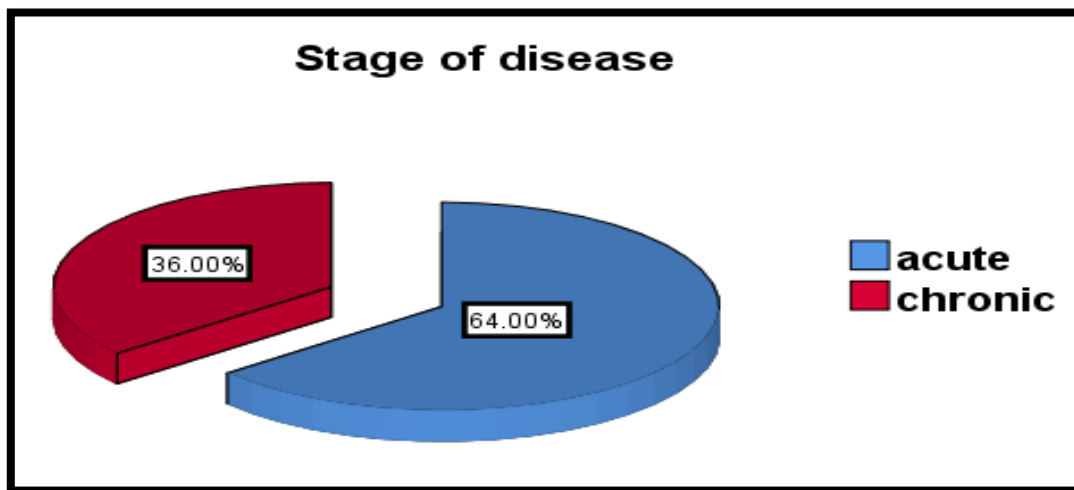
Age grupos (years)	Male			Female	
	Total	n	%	N	%
< 30	18	9	50 %	9	50 %
30-70	32	17	53 %	15	46 %
<b>Total N.</b>	50	26	52 %	24	48 %

The severity of disease that was divided by specialized doctors into two stages, which are acute and chronic. The results show acute stage of disease in 32- patients (64%) and chronic stage in 18-patient (36%) figure (1)

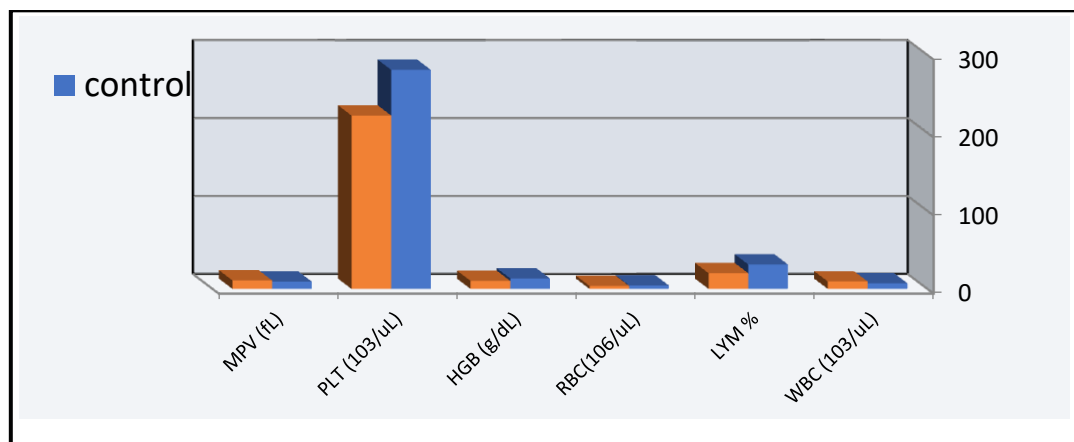
also show changing in the levels of all parameters between acute and chronic stages of the disease (Table 3).

**Table 3: Hematology parameters according to stage of disease**

Parameters	Acute (mean ± SD)	Chronic (mean ± SD)
WBC (10 <sup>3</sup> /uL)	8.47 ± 1.94	11.62 ± 1.26
LYM %	21.59 ± 5.25	17.71± 3.35
RBC(10 <sup>6</sup> /uL)	4.03 ±1.23	3.42 ± 0.60
HGB (g/dL)	11.39 ± 2.49	8.48 ± 1.41
PLT (10 <sup>3</sup> /uL)	214.59 ± 123.37	236.17 ± 166.76
MPV (fL)	10.00 ± 1.35	12.56 ± 0.99



**Figure (1): Stages of hepatitis B virus**



**Figure 2: The levels between the control and patients groups**

**Hematological parameters**

The results show chainging in the levels of all parameters when compared between patients hepatitis B-virus and control group . Notice the increase in the levels of WBC (9.60 ±

2.29) and MPV (10.92 ± 1.74) wherase , show decrease in the values of LYM (20.19 ± 4.99) , RBC (3.81 ± 1.08), HGB (10.35 ± 2.57) and PLT (222.360 ± 139.23).Table (4)

**Table (4) Haematology parameters for control and patients groups**

Parameters		(mean ± SD)	p.value
WBC (10 <sup>3</sup> /uL)	Control	7.21 ± 1.61	0.002
	Patients	9.60 ± 2.29	
LYM %	Control	31.36 ± 7.03	0.010
	Patient	20.19 ± 4.99	
RBC(10 <sup>6</sup> /uL)	Control	4.43 ±0.64	0.001
	Patients	3.81 ± 1.08	
HGB (g/dL)	Control	13.52 ± 1.37	0.003
	Patients	10.35 ± 2.57	
PLT (10 <sup>3</sup> /uL)	Control	280.90 ± 92.41	0.020
	Patients	222.360± 139.23	
MPV (fL)	Control	9.35 ± 1.09	0.007
	Patients	10.92 ± 1.74	

\*The significance results when P-Value ≤ 0.05.

\*\* WBC:white blood cells , LYM: lymphocyte , RBC: Red blood cells, HGB: Hemoglobin , PLT: Platletes , MPV : Mean platletes volume

**DISCUSSION**

The infection of hepatitis B virus (HBV) continue to be a hazard for world health, thus , the hematological parameters have specific purpose, and studies have appear demonstrated viral hepatitis influence on these parameters [10,11].

The results show the stages of disease are divided into tow stages acute and chronic , acording to the mention in the [7] who reported HBV infections are a serious worldwide disease that can lead to acute and chronic infections in people

In the current study , HBV- patients group showed different levels with control groups : the results show increase in the levels of WBC and MPV whearas , decreased in the levels of LYM, HGB ,RBC count and PLT count

Several studies support the results of the current study, highly significant in total WBC and low in the levels of RBC, HGB ,PLT and LYM in the acut and chronic patients-HBV when compared with the control group [12].

Also the result of study by [ 13 ] showed increase in WBC in the infected patients (8.73x10<sup>8</sup>/l) when compared with the healthy persons (6.37x10<sup>8</sup>/l). And lower HGB (10.48g/dL) in patients when compared with control (11.54g/dL).

Acording to several studies the inflammation and tissue nfection lead to abnormal results in hematological parameters . Whereby ,gives information about of HBV disease and this may cause changes in the values of haemostatic such as , haemoglobin ,platletes and white blood cells disruptions which include changes

in numbers of Lymphocyte, Eosinophile and Neutrophil as immune response to inflammation and viral infection [14,15]

White blood cells have an important role in the immune system, during the surprise outbreaks of epidemic, hence an higher levels in the WBC among the infected patients are not sudden as the white blood cells are likelihood released to killing the foreign objects, in other words, when the antigen penetrates the host cells to create disease [16]. This could explain the rise of these cells in HBV infection.

The decrease of haemoglobin can be caused by autoimmune hemolytic anemia and temporary bone marrow inhibition which may be comorbidities viral hepatitis [14].

decrease of RBC can be caused by hemolytic anemia that may occur immediately after infect with HBV disease or during or after an incidence of hepatitis in acute stage [17]. Also, Rarely, particularly after HBV infections, can acute stage of hepatitis show extrahepatic signs including hemolytic anemia [18]. The average of mean platelets volume is increased, it is known that HBV and platelets

interact together. Hepatitis B- virus can infect the bone marrow directly, inhibition the synthesis of platelets and quicken platelets disrupted by stimulating the immune cells and macrophage-monocyte system. [19]

Several studies appear the abnormal levels of MPV is indicated the severity, fibrosis and inflammation in HBV- disease [20]. in the current study we have found that highly in the levels of MPV in HBV-patients compared with control. Also agrees with the study by [21] who reported the highly significant in MPV in the patients with chronic hepatitis B- virus and correlate with severity.

## CONCLUSION

The results of the current study showed that HBV infection affects on haematological parameters include WBC, LYM, RBC, HGB, PLT and MPV. As such these markers could be used as helper parameters for diagnose the viral infection.

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