

Evaluation of Interleukin -1 β , GOT, and GPT in Patients with Giardiasis in Thi-Qar Province

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Abstract— Giardiasis is a well-known gastroenteritis that causes small intestine malabsorption and fatty diarrhea. The current study was performed from the start of September 2021 to the end of March 2022. Fifty blood samples were collected from suspected infected patients with *G. lamblia* when they returned to the laboratory to receive the result of microscopic analysis and were proved to be infected with the parasite, and (40) blood samples were collected from healthy people as a control group. This study reveals a significant increase in the level of interleukin-1B, being (2.807) in the infected patients. Higher than in the control group (0.454). The study of biochemical parameters of patients infected with parasites showed an increase in the concentration of liver enzymes (GOT and GPT) in patients and compared to the healthy group.

Keywords— Giardiasis, Interleukin-1 β , GOT, GPT

I. INTRODUCTION

Giardiasis is an important cause of waterborne and foodborne diarrhea, daycare center outbreaks, and traveler's diarrhea (Leung *et al.*, 2019). Giardiasis is caused by *Giardia lamblia*, which is a flagellate protozoan parasite. It is an extracellular parasite of the gastrointestinal tract found in various of animal species and humans. This parasite spread through the fecal-oral route, which is frequently through the ingestion of contaminated water and food, or through person-to-person transmission (Leung *et al.*, 2019). Giardiasis, is one of the most serious infections affecting children under the age of five, it is found in 15% of babies under the age of two in developing countries (Ansell *et al.*, 2015). Giardia infection, is characterized by small intestine malabsorption and fatty diarrhea, this occurs due to direct damage to the intestinal lining or mechanical obstruction of the intestinal villi and absorption (AL-kahfaji & Alsaadi, 2019). The prevalence rate of giardiasis in developing countries, can range between 20% to 30%, with some studies reporting a 100% frequency, while in developed countries, the prevalence can range from 3% to 10%. (Dann *et al.*, 2018). *G. lamblia* has two stages in its

life cycle, trophozoite and cyst: trophozoite is the pathogenic stage, and cyst is the infective stage, both of which were found in the feces of giardiasis patients. During infections, Giardia does not usually cause overt inflammation in the host's small intestines, though it can be seen in some cases (Buret *et al.*, 2019; Serradell *et al.*, 2019). In both humans and animals, Giardia causes a strong adaptive immune response. IL-1 β plays an important role in protective immunity parasitic infection. Monocytes are critical for controlling *G. lamblia* infection by induce the cleavage of pro- IL-1 β and the release of mature IL-1 β (Silver and Hunter, 2010). Experimental studies have shown that aminotransferase levels may change during parasitic infections. GOT and GPT transfer an amino group to alpha keto acid. Thus, changes in these enzymes are due to the destructive effects of parasites on liver function (Rahimi *et al.*, 2017). Several studies have found that GOT and GPT levels are elevated during giardia infection. This is due to a change in the metabolic functions of the liver during the period of infection with diarrhea caused by inflammation, which leads to malnutrition and malabsorption due to disturbance in the liver function (Farthing *et al.*, 1986). However, the traditional method of diagnosis is to look for *G. lamblia* trophozoites or cysts in the stool of infected patients by examining stool sample. However, in recent years, more objective techniques (e.g., immunoassay, Nucleic Acid Amplification Techniques (NAAT) have been used in the diagnosis of *G. lamblia* (Heyworth, 2014).

II. SUBJECTS AND METHODS

A. Blood Samples Collection

The samples were taken from both sexes, male and female, and different age groups, from 1 to 50 years of age. A total of 50 blood samples were collected from suspected infected patients with *G. lamblia* when they returned to the laboratory to receive the result of microscopic analysis and proved to be infected with the parasite, and (40) blood samples were collected from healthy patients as control groups from Al-Chabaish

General Hospital, the Martyr Saeed Al-Asadi Health Center in Al-Chabaish distric, Bint Al-Huda Teaching Hospital, and Al-Hayat National Laboratory in the Al-Chabaish district.

B. Examination of stool samples

The stool samples were examined with the naked eye before being microscopically examined for color, consistency, and blood and mucous, after that microscopic examination. The first step in the present study is to identify the positive samples from whole samples that were collected from suspected patients with giardiasis and examined microscopically to determine the parasite. A light microscope was used to detect trophozoite and cyst stages of *G. lamblia* after mixing double-blind check mixed with physiological saline (normal saline solution) prepared by dissolving 8.5 gm of pure sodium chloride (NaCl) in one liter of distilled water (Al-Abodi, 2018).

C. Serological test

Human Interleukin- 1B ELISA kit

This kit is an Enzyme-Linked Immunosorbent Assay (ELISA). The plate has been pre-coated with a human IL-1B antibody. (IL-1B) is added to the well and binds to antibodies coated on the wells and then biotinylated human IL-1B antibody is added to the sample and binds to (IL-1B) in the sample. Then Streptavidin-HRP is added and binds to the biotinylated (IL-1B) antibody. The reaction is terminated by the addition of an acidic stop solution, and absorbance is measured at 450 nm.

D. Biochemical test:

The concentration of serum GOT and GPT were measured by dry chemistry in the Fujifilm method by DRI-CHEM NX500 (Kainyu *et al.*, 2018).

E. Statistical Analysis:

To determine the variability in the study's results, the experimental data were analyzed using the statistical program SPSS software kit (version 20). Statistical significance was established as a (P-value <0.05). For data processing, statistical tests such as L.S.D were used.

III. RESULTS

A. Immunological Parameter

The current study's findings revealed an increase in the level of interleukin-1B. It was 2.807 higher than those of the controls group 0.454 as shown in (table 1).

Table 1: Comparison between infected patients and healthy control interleukins (IL-1B) concentration.

Groups	No.	Mean ± SD
		IL-1B(Pg/ml)
Infected Patients	50	2.807 ±0.32 a
Healthy Controls	40	0.454± 0.55 b
L.S.D		1.2

The different letters indicate significant differences for level $p < 0.05$.

L.S.D least significant difference

B. Biochemical Parameters

The Concentration of liver enzymes (GOT and GPT)

The serum GOT and GPT levels for giardiasis patients were clearly significantly increased ($p < 0.05$) when compared with serum GOT and GPT levels of healthy individuals as shown in (table 2, 3).

Table 2: Comparison between infected patients and healthy control GPT concentration.

Groups	Categories	N	Mean± S.E	P-value
patients	<1-14	17	40 ± 0.9 a	0.003
	15-29	9	26 ± 1.3 c	
	30-44	10	29 ± 0.7 c	
	>45	14	34 ± 2.1 b	
Total		50		
Control		40	19 ± 1.7 d	
L.S.D			5.03	

The different letters indicate significant differences at the level ($p < 0.05$).

Table 3: Comparison between infected patients and healthy control GOT concentration.

Groups	Categories	N	Mean± S.E	P-value
Patients	<1-14	17	43 ± 2.11a	0.001
	15-29	9	40 ± 3.1 a	
	30-44	10	19 ± 0.99 c	
	>45	14	39 ± 3.33 b	
Total		50		
Control		40	9 ± 1.11 c	
L.S.D			4.29	

The different letters indicate significant differences at the level ($p < 0.05$).

L.S.D least significant difference

IV. DISCUSSION

A. Immunological Parameter

The results of this study has shown a significant increases at probability level ($p < 0.05$) to interleukin 1-B in patients when compare with healthy as shown in the (table. 1). The host's responses to infection, inflammation, and trauma are controlled by pro-inflammatory cytokines, which can make the disease worse in co-disease states. While its biological activities overlap on a large scale, IL-1B is developed during early pregnancy by autotrophic cells at the interface between the fetus and the mother and is involved in trophoblastic invasion and tissue repair (Hunter and Remington, 1994). IL-1B is a pro-inflammatory cytokine that plays a critical role in host defense and innate immunity. The production of IL-1B is given its potent inflammatory properties. The production of IL-1B can also trigger immune pathology and tissue damage, reinforcing the importance of IL-1B regulation for maintaining innate immune function without excessive inflammation. IL-1B plays a vital role in protective immunity against parasitic infection. Silver et al. demonstrate that monocytes are critical for controlling *G. lamblia* infection by inducing the cleavage of pro-IL-1B and the release of mature IL-1B (Silver and Hunter, 2010).

B. Biochemical parameters

The serum GPT and GOT levels for giardiasis patients were significantly increased when compared with serum GPT levels of healthy individuals, as shown in table (2,3). Our results agree with Muhsin & Daoud (2015). This is consistent with what recorded in Tikrit,

which amounted (29.50) IU/L and (40.81) IU/L respectively also with Al-Abodi (2018). Which was recorded increase in the level of enzymes and the carrier values (18.3) IU/L and (19.9) IU/L, respectively, and with (Al-Jebory, 2005), in his study performed on patients with giardiasis recorded increase in the level of GOT and GPT , variation of liver enzymes (GOT and GPT) in serum is commonly considered as an indicator of some pathological changes of tissue and liver. Improper regulation of ALT synthesis would greatly affect the liver's ability to metabolize amino acids for energy production within the cell (Ragbetli *et al.*, 2014). These results may be due to diarrhea and poor digestion associated with *G. lamblia* , which results in no complete digestion of food and non-digestion as an energy source . Therefore, the body leans into the energy stored in the liver, resulting in a rise in the level of these enzymes (Al-Abodi, 2018). Inflammation of the intestine caused by parasitic infection leads to a change in the metabolic functions of the liver during the period of diarrhea, which leads to malnutrition and malabsorption due to liver function disorder and a high concentration of liver enzymes (Muhsin & Daoud, 2015).

V. CONCLUSION

The current study concluded that the levels of interleukin-1B and liver enzymes GOT and GPT are increased in patients with giardiasis when compared to healthy controls, that the increased level of interleukin-1B is due to immune response during infection, and that the increased level of liver enzymes is due to diarrhea and poor digestion of food and non-digestion as an energy source, where the body leans into energy stored in the liver, causing a rise in the level of these enzymes.

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