

# The effect of Toxoplasmosis on Hematological and Biochemical Parameters in Pregnant Women in Thi-Qar Province

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## Abstract

The aim of the present study was to detect the effect of infection with *Toxoplasma gondii* on hematological and biochemical parameters in pregnant women. Blood samples (103) were collected from emergency unit of Bent Al-Huda Hospital in Thi-Qar province during the period from October 2018 till March 2019. Samples gave agglutination results with latex test (79) were tested with ELISA test. Ten blood samples were collected from healthy pregnant women as control. Concentration of blood hemoglobin (Hb), total WBCs count, liver enzymes Glutamate Oxaloacetate Transaminase (GOT) and Glutamate Pyruvate Transaminase (GPT), lipid profile (total Cholesterol and Triglycerides) were estimated during this study using different commercial Kits.

**Keyword:** *T. gondii*, GOT, GPT, WBCs, Cholesterol, Thi-Qar

## Introduction

*Toxoplasma gondii* is one of the most common parasite of warm- blooded vertebrates including human with high prevalence. The parasite causing either acute or chronic infection<sup>(1)</sup>.

About 40% of the pregnant women have Toxoplasmosis. The fetus is got congenital toxoplasmosis during mother pregnancy. Transplacental transmission usually takes in the course of an acute infection<sup>(2)</sup>. Indirect diagnosis is obtained by serological and biochemical technique<sup>(3)</sup>.

Toxoplasmosis induces several immunological changes in the body of infected women which are characterize by the production of immunoglobulin's IgG, IgM and IgA<sup>(4,5)</sup>.

The replication of the toxoplasma inside the parasitophorus vacuole need substantial amount of the specific lipids for membrane biogenesis<sup>(6)</sup>.<sup>(7)</sup> found an association between toxoplasmosis with hepatomegaly and some abnormal liver function test.

## Materials and Method

Blood samples (103) of abortive women with Toxoplasmosis aged 17-46 years (at third month of

pregnancy) were collected from emergency unit of Bent-Al Huda Hospital, in Thi-Qar province during the period from October 2018 till March 2019. Five ml. of blood samples were collected from each abortive woman with different number of abortion (1-3) times. Ten blood samples were collected from healthy pregnant women had similar age of infected women, which considered as control group. Three ml. of blood placed in gel tube, centrifuged and then the collected serum were used in serological test (Latex and ELISA).

Each serum sample collected was tested with latex agglutination (Spinarect company from Spain).The result is consider positive if the agglutination appeared after the serum and latex solution added to each other on the slide.

Samples gave agglutination result (79) were tested with ELISA test Kit (forsight company in Germany) to detect the antibodies of *T. gondii* according to the manufacturers' instruction.

Concentration of blood hemoglobin (Hb) and total WBC count were carried out. Liver function was evaluated by the estimation of GOT, GPT and ALP enzyme. Spectrophotometer was used at 520 nanometer.

Level of lipid profile test (Total Cholesterol and Triglyceride= TGS) were estimated during this study using commercial Kits. Statistical analysis of the result were done using t-test, P value was considered significant when it was  $P \leq 0.05$ .

### Results

#### 1- Prevalence of *Toxoplasma gondii* antibodies:

Table (1) shows the higher prevalence of *T. gondii* antibodies IgG (84.8%) and 15.2% of IgM antibodies with high significant differences  $P \leq 0.05$ .

**Table (1). Prevalence of *Toxoplasma gondii* samples of aborted women according to IgM +, IgG+ antibodies**

Antibody	No.	%
IgG+	67	84.8
IgM+	12	15.2
total	79	

#### 2- Blood parameters:

Table (2) shows frequency and percentage of blood groups of aborted pregnant women. High percentage 41.8% was found in group O while lowest percentage 10.1% was found in group AB.

**Table (2). Frequency and percentage of blood groups of aborted women**

Blood groups	Frequency	%
A	24	30.4
AB	8	10.1
B	14	17.7
O	33	41.8
Total	79	100.0

Table (3) show the mean of WBCs (9.02) compared with (5.97) in control, while in Hb 10.21 and 11.44 respectively. Hb in women infected with *T. gondii* were increase significantly  $P \leq 0.05$ , while WBCs count decrease significantly compared with control groups.

**Table (3). Mean and standard deviation of blood parameter of infected aborted women and control groups**

	No.	WBC	Hb
		mean±SD	Mean ±SD
Toxo +	79	9.02± 3.59	10.21 ± 1.61
control	10	5.97 ±1.18	11.44 ±1.87

#### 3- Lipid profile

Table (4) shows the comparison of lipid profile (cholesterol and triglyceride) activities between the patients (aborted women) and control groups. The cholesterol in women with *T. gondii* were decreased significantly  $P \leq 0.05$  compared with control group, the triglycerides decrease in aborted women patient but not significant.

**Table (4). Mean and standard deviation of lipid profile of infected aborted women and control groups**

	No.	cholesterol mean±SD	Triglycerides mean±SD
Toxo +	79	200.51 ±47.59	115.18 ±31.69
control	10	162.1 ±40.87	100.8 ±10.5

#### 4- Liver enzymes

Table (5) shows the mean of GOT 15.11 compared with 12.1 in control groups while in GPT 14.67 and 12.4 respectively. The GOT and GPT in women infected with *T. gondii* were decreased significantly  $P \leq 0.05$  compared with control groups.

**Table (5). Mean and standard deviation of liver enzymes of infected aborted women and control groups**

	No.	GOT mean±SD	GPT mean±SD
Toxo +	79	15.11 ±3.74	14.67 ±2.95
control	10	12.1 ±2.42	12.4 ±2.17

Table (6) shows t- test and P values of infected aborted women with *T. gondii*. All values were

significant at  $P \leq 0.05$  except Triglycerides.

**Table (6). t- test value and P values of infected aborted women according to the above parameters**

parameters	t- value	df	P- value
Hb	2.21	87	0.03
WBCs	2.65	87	0.009
Triglyceride	1.42	87	0.159
Cholesterol	2.43	87	0.017
GOT	2.47	87	0.015
GPT	2.34	87	0.021

### Discussion

The results of the present study shows the higher prevalence of *T. gondii* antibodies IgG 84.8% and 15.2% of IgM with significant difference with  $P \leq 0.05$ .<sup>(8)</sup> showed that high prevalence 68.75% antibodies of IgG, while in IgM 31.25% with high significant difference.

Increasing in the rate of Hb of aborted infected women in the present study may be due to physiological and immunological status pregnant women infected with Toxoplasmosis, while the decreasing in WBCs might be due to the affected of these cells by the parasites which regarded as the most important factors controlling the cellular and humeral immunity response in the body of pregnant infected women<sup>(9,10)</sup>.

The decrease in mean of cholesterol and Triglycerides in the present study compared with control might be due to the infection with parasites which make huge variation in lipid parameters. In general cholesterol play a main role in cellular membrane organization dynamics function and categorization<sup>(11)</sup>. The parasites need cholesterol biosynthetic enzyme and must take it from its host<sup>(12)</sup>.

The main function of the liver enzyme is the storage and movement of nutrition detoxication and metabolism of water and electrolytes. *T. gondii* causes significant and progressive changes in the liver owing to remarkable proliferation of organisms<sup>(3)</sup>.

It was found from the present study that *T. gondii* affect the liver function which is cleared by decreasing GOT and GPT levels.<sup>(13)</sup> recorded an increase in GOT and GPT enzymes. No significant difference in the severity of the infected mice and control one was

showed by<sup>(14)</sup>.

The enzyme activities of GOT and GPT in the serum of aborted women indicating decrease in protein catabolism<sup>(1)</sup>.

The present results show a decrease of both enzymes which reflecting the degree of damage to the liver function. Regulation of hepatocyte metabolism depend either on increasing anabolism or decreasing catabolism<sup>(15, 16)</sup>.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

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