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DIAGNOSIS OF TOXOPLASMOSIS IN ABORTIVE WOMEN AND STUDY OF SOME HEMATOLOGICAL AND IMMUNOLOGICAL PARAMETERS AMONG INFECTED PATIENTS IN WASIT PROVINCE

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Abstract
The aim of study was detected of toxoplasmosis in Abortive Women and Study of some Hematological and Immunological Parameters among Infected Patients .120 blood samples were collected from aborted women (18- 40 years) whom attended to Al –kut Hospital for Gyneclogy and obstetrics and pediatrics. The results were revealed that 55(45.8%) positive for Toxoplasma antibodies. The higher infection rate was recorded in (25-30) years (40.0%) while the lower infection rate (9.09%) was recorded in age (36-40) years. The relation between infection with Toxoplasma and number of abortion has been studied, the results were showed that rate of one miscarriage in abortive women was 72.7% (40/55) higher than two and three miscarriages 23.6% (13/55) and 3.6% (2/55) respectively . The results showed high level of IL-10 and IL-17 in women with toxoplasmosis, which reached (290 ± 28.3 and 19 ± 2.4) pg/mL, respectively, compared to the control that reached (117 ± 11.8 and 9 ± 1.04) pg/mL, respectively. the result of Distribution of Patients According to Blood Groups Among the toxoplasmosis patients were the highest toxoplasmosis infection was found in the O blood group (43.7%), followed by A (31.2%), B (13.54%), and AB (11.45%). The mean levels of hemoglobin (10.4±3.8vs. 13.1±2.5 g/dL), red blood cell count (RBC 3.9*109±0.9 vs.4.4*109±0.9/µL), white blood cell count (WBC 11.2*109±1.9/L vs.6.7*109±1.8/L) and hematocrit (Hct 34.1±6.2 vs. 39.4±6.0 %) no significant variations were observed in mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and platelet count when comparing cases and controls for p-values > 0.05.

Keywords: Hematological , Immunological ,Toxoplasma gondii, Abortive Women.

Introduction

The Toxoplasma is a common in both high and developing countries, where it is prevalent as one of the most successful parasites causes major social and economic harm worldwide (1), The intensity and the patient's immune system will determine the infection's symptoms, which can range from fever, headache, and muscle soreness that mimics influenza symptoms to none at all in immunocompetent individuals (2).The infection with the Toxoplasma parasite in the intermediate host is of two types: the congenital form, and the acquired form, and the Felidae family is the final host of the parasite Oocysts are expelled with feces, polluting the environment (water, food, and soil) and are considered as a source of infection of intermediate

hosts, as they transmitted to their tissues and develop there, as well as transmission to intermediate hosts through consumption of raw or undercooked animal meat or Through placental transfer from mother to fetus (3). he creation of the immunoglobulin IgM, IgG, and IgA is one of the immunological alterations brought on by a toxoplasma infection (4). The purpose of this study was to determine how toxoplasmosis affected the hematological and immunological parameters of women who had abortions in the province of Wasit.

Materials and methods

Sample Collection:

120 samples of blood aborted women were collected from women whom attended to (Al –kut Hospital for Gyneclogy and obstetrics and pediatrics) from 10 October 2023to 10 February 2024 .

Detect antibodies by Enzyme Linked Immunosorbent Assay (ELISA)

The blood simple test that is available and useful for field studies, the test a large number of samples and targets both IgG, IgM, and IgA antibodies, It consists of a plate with holes on which the soluble antigen of the parasite is attached , When adding the serum to be tested, the antibody in the serum reacts with the antigen. Found in the pits after adding the enzyme-marked antiglobulin, it binds to the antibody , generating a color reaction that is read by ELISA reader (5).

Detect Human Interleukin-10 & Interleukin-17a (IL-10 & IL–17a) by (ELISA)

The washing solution was diluent (20X to 1X) with distilled water for later use (6) , then The procedure of the assay that followed was according to the protocol supplied with the kits.

The Quality Control & Results were :

1. Inspection of quality: The mean optical density positive >= 1.00 An average OD negative of less than 0.10
2. Outcomes: Average negative control value + 0.15 is the cutoff. While the threshold value for the OD sample is negative whereas the cutoff value for the OD sample is positive (6).

Hematological Parameters

An automated blood cell analyzer (XP-300 Automated Hematology Analyzer, Sysmex American Inc.) was used to conduct the blood tests (7).

Statistical Analysis

the SPSS program (version 18) software (2010) was utilized to analyze the current study's data using the Chi-square test. A P value of $p \leq 0.05$ was deemed statistically significant (8).

Result and Discussion

Detect presence of Toxoplasma antibodies in blood samples

One hundred and twenty blood samples were collected from aborted women (18- 40years) whom attended to Al –kut Hospital for Gyneclogy and obstetrics and pediatrics to find out if

IgG or IgM antibodies against Toxoplasma are present. Out of 120 suspected cases were tested antibodies, the results were revealed that 55(45.8%) positive for Toxoplasma antibodies as shown in Tables (1, 2). The higher infection rate was recorded in (25-30) years (40.0%) whereas the age group of 36 to 40 years old had the lowest infection rate (9.09%). The results of the statistical analysis revealed a significant variation (P<0.05) on the overall prevalence of *Toxoplasma among* women groups as shown in figure (1). The relation between infection with Toxoplasma and number of abortion has been studied , the results were showed The ratio of one miscarriage in infection women was 72.7% (40/55) higher than two and three miscarriages 23.6% (13/55) and 3.6% (2/55) respectively figure (2).

Table.1. the prevalence of Toxoplasma antibodies among Abortive Women

Toxoplasma antibodies test	Negative	Positive
120	65 (54.4%)	55(45.8%)

Table.2. Toxoplasma antibodies (IgG and IgM)in blood samples

Type of antibodies	IgG	Level (U/ml) Mean ±SEM	IgM	Level (U/ml) Mean ±SEM
55	43(54.4%)	5.12 ± 0.94	12(45.8%)	0.680 ± 0.14
$\chi 2$	15.07			
P value	0*			

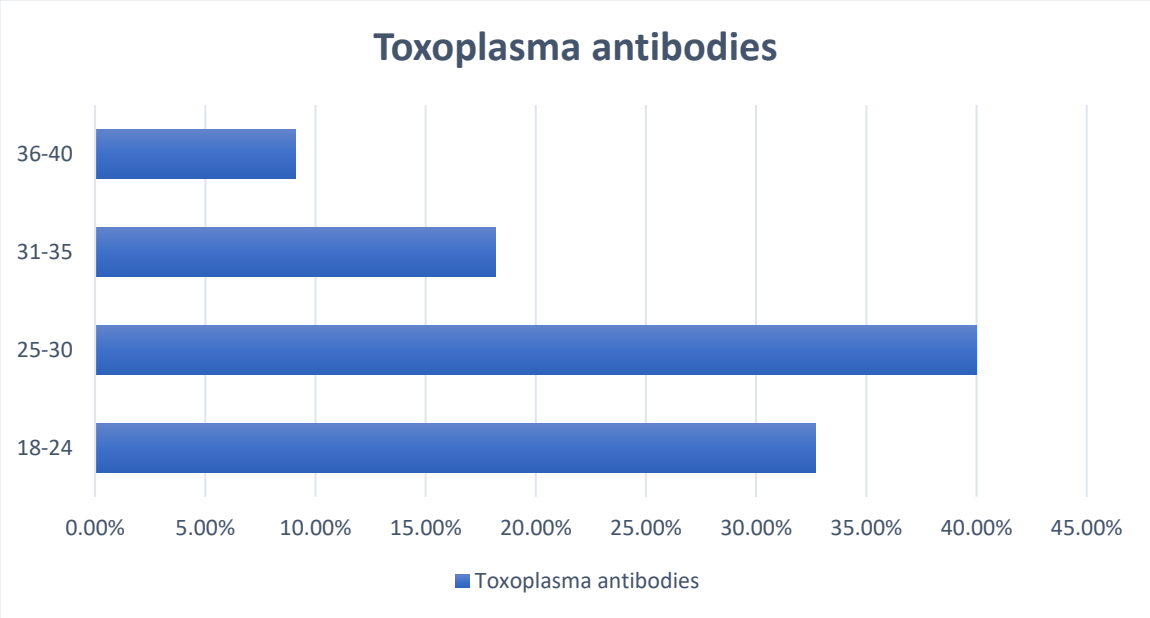

Figure .1. The relation between Toxoplasmosis and age of women

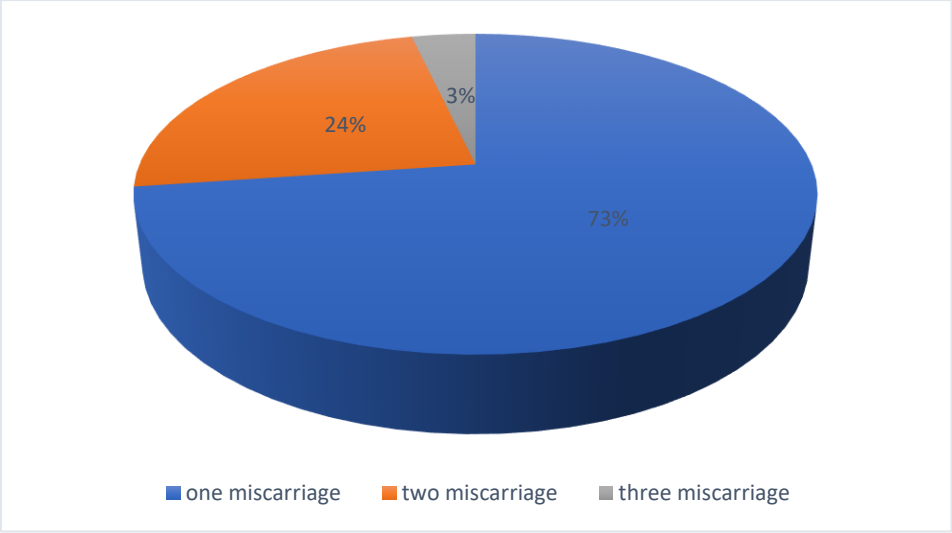

Figure .2. The relation between infection with Toxoplasma and number of abortion

This finding was consistent with the Waist study conducted in Iraq, which found that patients aged 41 and older were more impacted than other age groups anti-T. gondii antibody prevalence rises with age (9).The results of this study agree with a previous study conducted by Al-Mayahi. (10) in Waist Governorate (38.99%). It is an approach to the study of Darweesh *et al* ., (11) in Diyala Governorate, where it recorded 44%. , and the findings are closer to 43% that's recorded by Ali *et al*.,(12) study. The worldwide prevalence of Toxoplasmosis varies depending on many factors such as sample count, age, socioeconomic status, eating habits, hygiene, climate, educational level, and geographic location.

Level of interleukin IL-10 , IL-17A in Toxoplasmosis patients

The findings revealed that women with toxoplasmosis had higher levels of IL-10 and IL-17 (290 ± 28.3 and 19 ± 2.4 pg/mL, respectively) than the control group (117 ± 11.8 and 9 ± 1.04) pg/mL. The t-test statistical analysis revealed that there were significant differences in IL-10 between the study groups and between the toxoplasmosis-affected women's group and the control group in IL-17.

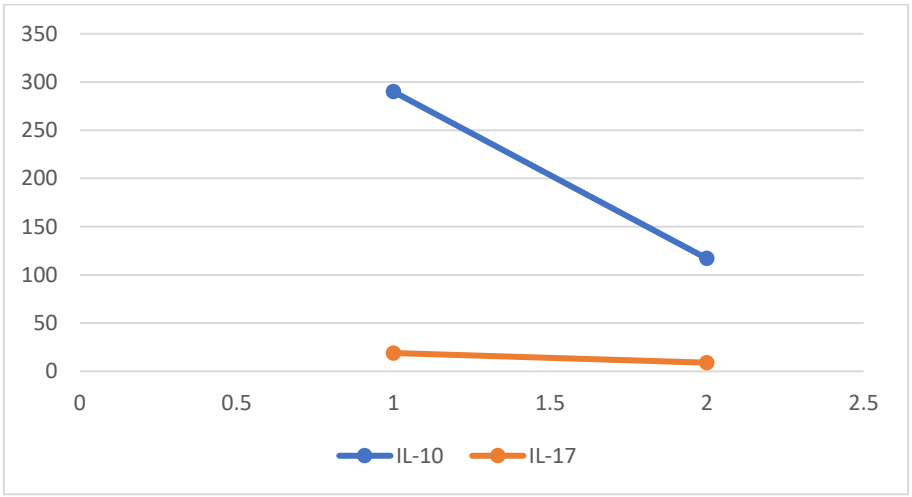

Figure .3.Level of interleukin IL-10 , IL-17A pg/mL

The results of this study agree with a previous study conducted by Al-Mayahi. (10) . who discovered a significant correlation between women with toxoplasmosis and their IL-10 level, with IL-10 levels in toxoplasmosis-affected women's sera being statistically higher than those of non-infected women. There were no statistically significant variations in IL-10 levels between women with toxoplasmosis and control, and no significant differences in IL-17 levels were reported by the earlier researchers.(13) Patients with toxoplasmosis have low IL-17 and high IL-10 levels, suggesting a Th1 and Th2 response deficit that might aid in the disease's progression(14). IL-17A levels generally rise during inflammation, infection, and antimicrobial responses, owing to its proinflammatory properties Several studies have investigated the role of IL-17A in toxoplasmosis, particularly its genetic expression at the mRNA level (15) demonstrated that dendritic cell populations are involved in stimulating CD4+ T cells to secrete IL-17A. The study revealed that dendritic cells can effectively induce the production of IL-17A in a laboratory setting. This is accomplished by modulating the differentiation of naïve CD4+ T cells towards T h17 cells. Additionally, they demonstrate the role of T.cell in the activation of IL-17A.(16) observed that dendritic cells incubated with IgM containing H. pylori strain produced significantly higher levels of IL-17A and IL-8 compared to cells incubated with a strain .The researchers conducted an in vitro experiment to examine the levels of these cytokines in the normal and ulcerated regions of the antrum. There was a significant rise in interleukin levels in patients infected with toxoplasmosis compared to those who were not infected.

Blood group infection with toxoplasmosis

Patient Distribution In line with Blood Groups The blood group O had the largest percentage of toxoplasmosis infections among the patients (43.7%), followed by A (31.2%), B (13.54%), and AB (11.45%) Figure (3).The most important system in human blood transfusion is the blood group system. The blood type antigens found on red blood cells serve as biological markers for each individual and may offer protection against some infectious diseases (17). According to the blood group , as illustrated in Figure (4) , the prevalence of toxoplasmosis infection was higher for type O blood (43.7%) compared to other blood group types (A = 31.2% , B = 13.54% , AB = 11.45%). The current result revealed that patients with the O blood group were more prone to infection and AB blood group lower to infection. This result was similar to other studies that manifest the higher sensitivity of the O blood group to toxoplasmosis infection (18).While the present results opposed some studies which explained that The O blood group did not act as a risk factor for toxoplasmosis infection (19).

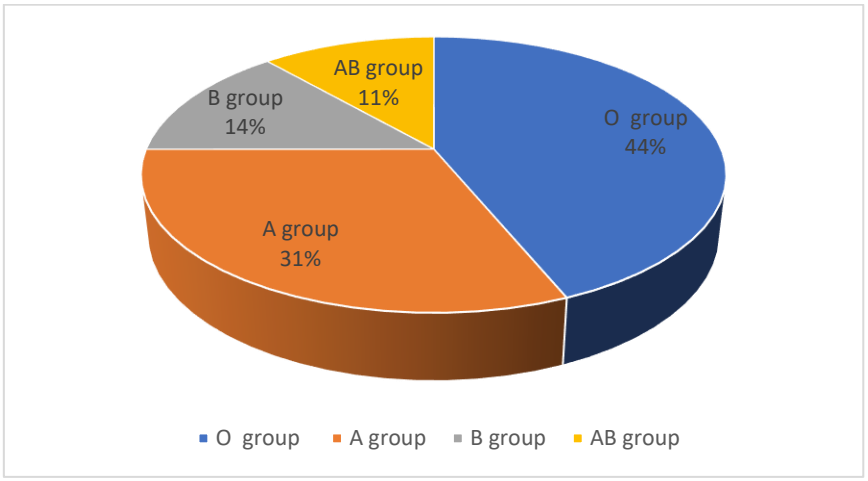

Figure .4. Distribution of Patients According to Blood Groups

Hematological Parameters of toxoplasmosis.

The hematological parameters of the **toxoplasmosis** test among participants who had positive test compared to participants who had negative test compared. The mean levels of hemoglobin (10.4±3.8vs. 13.1±2.5 g/dL), red blood cell count (RBC 3.9*109±0.9 vs.4.4*109±0.9/µL), white blood cell count (WBC 11.2*109±1.9/L vs.6.7*109±1.8/L) and hematocrit (Hct 34.1±6.2 vs. 39.4±6.0 %) were significantly lower among participant has positive test compared to participant has negative toxoplasmosis test at p-value < 0.001). However, no significant variations were observed in mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and platelet count when comparing cases and controls for p-values > 0.05 Table.3.

Table.3. the hematological parameters in women with toxoplasmosis

N	Hematological parameter	toxoplasmosis		*t*-value	*p*-value
		Positive(n-55)	Negative(n-65)		
1	hemoglobin Hb (g/dL)	10.4±3.8	13.1±2.5	−4.659	0.003
2	RBC ($\times 10^9$/µL)	3.9±0.9	4.4±0.9	−6.352	0.005
3	WBC ($\times 10^9$/L)	11.2±1.9	6.7±1.8	−2.061	0.045
4	hematocrit Hct (%)	34.1±6.2	39.4±6.0	−6.259	0.001
5	MCHC (g/dL)	33.5±2.0	34.035±1.35	−2.670	0.009
6	MCV (fL)	80.5±11.5	80.9±9.0	0.453	0.542
7	MCH (pg)	29.4±3.4	29.3±2.3	0.283	0.711
8	RDW (%)	14.0±2.4	12.9±1.9	3.448	0.002
9	PLT ($\times 10^9$/L)	276.7±106.6	261.6±84.5	1.354	0.327

Any alterations in the WBC could indicate severe anomalies in the toxoplasmosis-positive persons' medical status. In the current investigation, there was a significant difference in the decline of Lymph (%), MID (%), and Gran (%) with respect to the total number of WBCs. As a result of toxoplasmosis, the data indicate a decrease in white blood cells (WBCs) in infected women. It is regarded as one of the crucial elements governing the body's innate and acquired immune response in infected pregnant women (20). Our findings concurred with those of another study conducted in Iraq among women seeking abortions (21). According to earlier research, neutrophils play a critical role in regulating toxoplasmosis in mice and humans (22). Our data revealed that Mean Lymph and MID were higher in the T. gondii-infected group than in the control group. On the other hand, positive participants had lower Gran percentages and total WBC counts. The increased proportion of Gran and lymphocytes is most likely the result of an inflammatory reaction to the infection-related tachyzoite proliferation (23).

Conclusion

Toxoplasmosis infections can boost the immune system of the infected host and have negative effects on healthy hosts. The determination of the degree of illness and the likelihood of recovery for impacted individuals can solely rely on clinical and laboratory information, including biochemical and haematological indicators.

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