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Insulin levels in pregnant and abortion women infected with Toxoplasma gondii

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ARTICLE

Insulin Levels in Pregnant and Abortion Women Infected With *Toxoplasma gondii*

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Abstract

In this study, 15 totally married individuals from the Women's and Children's Hospital and several private laboratories in Al-Diwaniyah Governorate were evaluated in an attempt to diagnose infection with *Toxoplasma gondii* from period 27-11-2022 to 16-4-2023.

Where a serological immunoassay was conducted in order to detect the presence of the Toxoplasma conidia parasite, it was found from the current study that the age group (26−35) years is the most likely age group to have abortions. The results of the current study showed that there is a significant effect of the occurrence of abortions in the different age stages of pregnant women, while the age group (35−40) years is the least likely age group to obtain abortions due to infection with toxoplasmosis. The results of the statistical analysis showed that there were significant differences between the number of miscarriages and births with the age groups.

Keywords: Insulin level, Toxoplasma, Gondii

1. Introduction

Humans and animals are both hosts for the main parasite that causes *Toxoplasma gondii*, which is a zoonotic illness It has a widespread infection that is practically universal. It affects almost a third of the world's population, and the rate at which it spreads differs between nations and among different population groups [1,2]. Feces from cats are the only animals whose feces pass through the Oocyst, making them intermediate and final hosts. Sheep and goat meat are a significant source of infestation, as are mammals like humans and birds [3].

Clinical manifestations depend mainly on when the infection was acquired in utero. Infectivity is highest during the later stages of pregnancy; however, the earlier in gestation is an infection which occurs, the greater the likelihood of severe postnatal sequelae [4]. Most cases of acquired *Toxoplasma* infection are asymptomatic and self-limited; hence many cases remain undiagnosed. The incubation period of acquired infection is estimated to be lasted or continued during 4−21days [5].

When symptomatic infection does occur, the only clinical findings may be focal lymphadenopathy. This involves a single site around the head and neck frequently. Acute infection is rarely accompanied by a mononucleosis-like syndrome characterized by fever, malaise, sore throat, headache and an atypical lymphocytosis on peripheral blood smear [16]. The major objective cause is that one third of the world population has been infected with *Toxoplasma gondii*. The latent *toxoplasmosis* was recently considered as asymptomatic which has potentially been shown to have serious consequences for physical and psychical health [6].

Serological studies showed a considerable difference in the prevalence of *Toxoplasma* infection from 0 to 95% in different parts of the world and indeed between different population groups within the same country [7−9,14]. Infection with *T. gondii* results in serious illness. Splenomegaly, Chorioretinitis, Pneumonitis, Encephalitis, Mental Retardation, and

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Other organ failures, which may result in death [10]. This study will focus on a molecular analysis of the parasite *Toxoplasma gondii* as well as several epidemiological and clinical markers in affected patients.

2. Methodology

Sample collection: Whole blood samples were clinically and laboratory collected from 15 *Toxoplasma* infected patients. The samples were collected between 27 and 11–2022 to 16-4-2023 from a clinical laboratory in Diwaniyah Teaching Hospital and many private laboratories in Diwaniyah.

IgG and IgM antibodies detection: This assay was performed by two different approaches. One for detection of IgG and another one for detection of IgM specific antibodies against *T. gondii* antigens among the patient's serum.

2.1. *IgG antibody to* TOX

The test utilizes antibodies including a recombinant *TOX* antigen and goat anti-mouse IgG antibody on the nitrocellulose membrane with colloidal gold marked anti-human IgG as a mark tracer. The reagent is used to detect the *TOX*-IgG according to the principle of capture method and gold immunochromatography assay. The sample mixing up anti-human IgG-marker move along the membrane to the T line, and form the T line with recombinant *TOX*-IgG, which is positive result. Conversely, it is a negative result.

2.2. *IgM antibody to* TOX

When the sample to be detected contains the *TOX*-IgM antibody, it firstly forms complexes with gold monoclonal antibody, and move forwards with the effect of chromatography, then reacts with the recombinant *TOX* antigen. If there appears a red line (Test Line, T) which can be seen with naked eye, that is a positive result, the unreacted marker moves continuously forwards, and combines with anti-mouse antibody to form a red contrasting line (c), if the test line does not appear, that is a negative result.

3. Results & discussion

The current study's findings are shown in Table 1 for pregnant women infected with the parasite, where a recent infection was discovered when we tested IgM in Afak, Al-Hamza, and Al-Sunya, but no infection was identified in Al-Daghara or the city center of Al-Diwaniyah.

In the case of IgG, an ancient infection was discovered in the city centers of Al-Daghara, Afak, Al-Hamza, Al-Sunniyeh, and Al-Diwaniyah.

POSITIVE: Two distinct colored lines appear. One Line should be in the control region (C) and the other line should be in the test region (T).

NEGATIVE: One colored line appears in the control region (C). No apparent colored line appears in the test region (T). The negative result does not indicate the absence of analytic in the sample it only indicates the level of tested analyses in the sample is less than cut-off level.

INVALD: No colored lines appear or the control line fails to appear, indicating that there is a fault in the workpiece. Because of this error we will re-test with a new test device.

The current study's results are shown in Table 2 for aborted women infected with the parasite, where we identified infection when we investigated IgM in the center of Diwaniyah, Sudair, Algeria, Daghara, and officers. In terms of IgG, an ancient infection was discovered in the city centers of Diwaniyah, Al-Sudair, and Al-Daghara, but there was no infection in Algeria or among the officers.

The case study results in Table 3 showed that the IgM and IgG tests for pregnant women were normal, and there were no symptoms (see Table 4).

It might fail to detect specific anti-*Toxoplasma* IgG or IgM during the active phase of *T.gondii* infection, therefore, the risk of congenital *toxoplasmosis* of a fetus might be undetected because the pregnant mother might test negative during the active phase of *T.gondii* infection, furthermore, the test might fail to detect *T.gondii* infection in certain immunocompromised patients due to the fact that the titers of specific anti-*Toxoplasma* IgG or IgM antibodies might fail to rise in this type of patient [11].

The current study showed a higher percentage of infection with IgG than infection with IgM, as the reason for the high percentage of infection with IgG is due to the fact that it is the only antibody that can be transmitted from the pregnant mother to the fetus through the placenta, as it provides the necessary protection for the fetus until the completion of the formation of the system Immunity is due to the presence of antibodies, and the percentage of infection with IgG is in chronic cases or those that were previously infected with *toxoplasmosis* [13].

Based on this, the presence of *Toxoplasma* DNA in the maternal blood probably indicates a recent infection or apparent parasitaemia, which is likely to be clinically significant. The clearance time for *Toxoplasma* DNA from the blood of patients with acute *toxoplasmic* lymphadenopathy was estimated to be 5.5–13 weeks [12].

Table 1. Shows the infection of pregnant women infected with the parasite, noting that the insulin level in all samples was found to be normal.

Educational level	Symptoms	IgG/IgM	The number of abortions	The number of pregnancies	The age	Living	Collection date
graduate	Fetal malformation	Ve+/ve-	2	3	28	Dudgarh	11/22
primary	bleeding	Ve+/ve+	1	2	32	Afak	11/25
graduate	thrombus neighbor	Ve+/ve -	2	4	26	Diwaniyah Center	11/29
secondary	lower back pain	Ve+/ve+	1	2	34	Al-Hamza	12/8
graduate	Fetal malformation	Ve+/ve+	1	3	30	Al-Sunya	12/8

Table 2. Shows the infection of aborted women infected with the parasite/noting that the insulin level in all samples was found to be normal.

Educational level	Symptoms	IgG/IgM	The number of abortions	The number of pregnancies	The age	Living	Collection date
graduate	thrombus neighbor	Ve+/ve+	1	1	29	Diwaniyah Center	11/29
secondary	bleeding	Ve+/ve+	4	4	33	Sudair	12/15
graduate	general weakness	Ve-/ve+	2	2	27	Diwaniyah/Algeria	12/17
graduate	Fetal malformation	Ve+/ve+	3	3	30	Dudgarh	12/20
graduate	Fever	Ve-/ve+	1	1	32	Diwaniyah/officers	12/20

Table 3. Shows pregnant women who are healthy from the parasite.

Educational level	Symptoms	IgG/IgM	The number of abortions	The number of pregnancies	The age	Living	Collection date
primary	No found	Ve-/ve-	0	3	22	Al-Sunya	12/29
secondary	No found	Ve-/ve-	0	1	19	Diwaniyah Center	1/4
secondary	No found	Ve-/ve-	0	4	20	Sudair	1/4
graduate	No found	Ve-/ve-	0	2	24	Sumer	1/15
secondary	No found	Ve-/ve-	0	1	18	Diwaniyah Center	1/19

Table 4. Shows the distribution of toxoplasma *infection according to the different age stages of pregnant women.*

infection rate %	Age group
6.67	20–15
30.81	25–21
51.14	30–26
48.55	35–31
20.53	40–36
6.20	41– and above

The current study showed that there were no significant differences between the residential area and infection with *toxoplasmosis* in Thi-Qar, and the infection cases were more in the city center than in the districts and sub-districts. Its excrement in large places reduces the infection rate, but in the city, its presence is in specific places, including parks, and it may lead to an increase in the infection rate [15, 17].

4. Conclusion

From the results of the current study, the following conclusion appears Due to an insufficiency of samples in the current investigation, there are no distinct variations among parasite infection, the number of abortions, mental health issues, academic achievement, and residential locations. The illness had no effects on blood components other than the effect on blood platelets. The highest rate of infection was in the age group (26–30) using IgG and the age group (36–40) using IgM.

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References

1 Steven E, Schmitt B, Golovko A, Mahdi E, Santanu K. *Toxoplasmosis*. Chapter 2. 9. 10. In: Barry ON, editor. Terrestrial manual. 6th ed. OIE Scientific Publications; 2008.
2 Rosso F, Les JT, Agudelo A. Prevalence of infection with *Toxoplasma gongii* among pregnant women in Cali, Colombia, South America. Am J Trop Med Hyg 2008;78:504–8.
3 Sevgili MCB, Nalbantoglu S, Vatansever Z. Deter-mination of Seropositivity for *Toxoplasma gondii* in sheep in Sanliurfa province. Turk J Vet Anim Sci 2005;29:107–11.
4 Garcia-Meric P, Frack J, Dumon H, Piarroux R. Management of congenital *toxoplasmosis* in France: current data. Presse Med 2010;39:530–8.
5 Bowie WR, King AS, Werker DH, Isaac-Renton JL, Bell A, Eng SB. Outbreak of *toxoplasmosis* associated with municipal

drinking water. The BC *toxoplasma* investigation team. Lancet 1997;350:173–7.
6 Arling TA, Yolken RH, Lapidus M, Langenberg P, Dickerson FB, Zimmerman SA, et al. *Toxoplasma gondii* antibody titers and history of suicide attempts in patients with recurrent mood disorders. J Nerv Ment Dis 2009;197:905–8.
7 Asthana SP, Macpherson CN, Weiss SH, Stephens R. Seroprevalence of *Toxoplasma gondii* in pregnant women and cats in Grenada, West Indies. J Parasitol 2006;92:644–5.
8 Ghorbani M, Edrissian GH, Assad N. Serological survey of *toxoplasmosis* in northern part of Iran, Using in direct fluorescent antibody technique. Trans R Soc Trop Med Hyg 1978; 72:369–71.
9 Fan CK, Su KE, Wu GH. Seroepidemiology of *Toxoplasma gondii* infection among two mountain aboriginal populations and South east Asian laborers in Taiwan. J Parasitol 2002;88: 411–4.
10 Montoya JG, Liesenfeld O. Toxoplasmosis. Lancet 2004 Jun 12; 363(9425):1965–76. https://doi.org/10.1016/S0140-6736(04)16412-X. PMID: 15194258.
11 Morussi R, Madalena TM, Alves D, Azevedo P. *Toxoplasma*-IgM and IgG-avidity in single samples from areas with a high infection rate can determine the risk of mother-to-child transmission. Rev. Inst. Med. Trop. S. Paulo. 2006;48(2): 4665–76.
12 Guy EC, Joynson DHM. Potential of the polymerase chain reaction in the diagnosis of active *Toxoplasma* infection by detection of parasite in blood. J Infect Dis 1995;172:319–22.
13 Abbas. Histopathological and parasitic immunological study of the umbilical cord and placenta in women infected with *toxoplasmosis*. College of Science, Al-Mustansiriya University; 2005. PhD thesis.
14 Abu-Zeid YA. Serological evidence for remarkably variable prevalence rates of *Toxoplasma gondi*i in children of major residential areas in United Arab Emirates. Acta Trop 2002;83: 63–9.
15 Ghazzi. Diagnostic and epidemiological study of *Toxoplasma gondii* and CMV in pregnant and aborted women in Thi-Qar Governorate, Master Thesis. In: College of Education for pure Sciences,. Thi-Qar University; 2012.
16 Lynfield R, Guerina NG. Toxoplasmosis. Pediatr Rev 1997;18: 75–83.
17 Suarez O, Estevenz J. Seroepidemiology of *Toxoplasmosis* infection in women of childbearing age from a marginal community of Maracaibo. Venezuela Inst Med Trop Sao Paulo 2009;51(1):13–7.