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Detection of IgM and IgG antibodies in *Toxoplasma gondii* Infections among Iraqi Women

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Abstract

This study aimed to investigate the IgM and IgG antibodies of *Toxoplasma gondii* infections in thirty females dealing with animals and those do not by using rapid serological test, the crosss sectional study for thirty participant females aged 20 – 40 years in al-bayan University, were collected during the period from January to March . The results for diagnosis of immunoglobulins against *T. gondii* parasite by Cassette (Toxo-IgG / IgM), indicated that (1) sample out of 30 (11.11%) positive results for IgG antibodies in females dealing with animals and (3) out of 30(14.29%) positive results for IgG in females those do not dealing with animals and the results for type IgM antibodies was negative to all thirty samples. This study confirmations that *Toxoplasma gondii* can infect women who do not deal with animals. Despite of the domestic animals are considered as carrier host to the humans and incidence of toxoplasmosis for individuals.

Keywords: Immunoglobulin, Zoonotic Toxoplasmosis, Iraqi women, Serological test.

الكشف عن الأجسام المضادة *IgM* و *IgG* في التوكسوبلازما جوندي بين النساء العراقيات

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الخلاصة

نستنتج أن التوكسوبلازما جوندي يمكن أن تصيب النساء اللواتي لا يتعاملن مع الحيوانات على الرغم من أن الحيوانات الأليفة تعتبر مضيفة حاملة للإنسان ونسبة حدوث داء المقوسات للأفراد. أيضًا ، تظهر الدراسة الحالية أن اختبار التوكسوبلازما السريع له دور مهم في التطبيقات السريرية لأنه اختبار سهل وسريع وغير مكلف الأداء ويعتمد على تحديد العدوى.

1. Introduction

The parasite *Toxoplasma gondii* causes Toxoplasmosis which is a zoonotic disease that can be infect both animals and humans [1]. More than two billion people are affected by this disease around the world [2]. When an infection occurs in a pregnant woman, the severity of this infections can range from moderate to severe, resulting in substantial consequences for the unborn. *T. gondii* is widespread protozoa on planet, also can be cause infertility and improper embryo delivery in the infected host [3]. As the infection is symptomless, the diagnosis depend on a number of specific analysis for body fluids such as biochemical, serological and molecular tests [4]. Different diagnostic approaches are available; nevertheless, serology is the most common form of diagnosis [5]. Because of the close contact of domestic animals to humans, who operate as a carrier host, and the incidence of toxoplasmosis in females. As a result, the current investigation will use the Rapid Test Cassette (IVD) to evaluate the incidence of *T. gondii* in females as well as the detection of antibodies in sera (IgG, IgM).

2. Materials and methods

Collection of samples

From each thirty participant females aged 20 – 40 years, we collected specimens after them agreed , specimens were drawn from veins and putt in gel tubes and left at temperature of room before set up centrifuge at 3000 rpm for 10 min to isolated the serum .The separated serum was saved frozen in (– 20C) till performance of the tests.

Examination

The collected serum were detected via Rapid Test Cassette (Toxo-IgG / IgM) for differentiate toxoplasma immunoglobulin in serum plasma or whole blood of human.

Test procedure:

According to manufacturer instructions in diagnostic Kit (Onsite Toxo IgG/IgM) we added a drop of serum with a drop of sample diluent buffer into the well of sample. Then we set the timer for 15 minutes and wait for reading the results. Toxoplasma antigen is coated at the test line of the membrane and when the specimen is tested, it reacts with goat anti human IgM or IgG coated particles by capillary actions. When the combination transfers toward the membrane and reacts with specific toxoplasma antigen on the test line, we see colored lines indicating a positive result, here we can show probable results as:

Negative control: Only control band (c band) indicates color development, while two bands (T1 & T2) do not.

Positive control: Color development can be seen in c band with two bands (T1 & T2).

Interpretation of the findings of the assay:

Negative result can Interpretation as: presence of color only in c band while lack of color in both T bands (T1 & T2) indicates that no toxoplasma immunoglobulin.

Positive result can Interpretation as: if only T1 band color appeared with presence c band this mean IgM- anti Toxoplasma is present in specimen (Positive IgM) but if only T2 band is developed this mean (Positive IgG) while if both T1 & T2 bands are developed with presence of C band this means (positive IgM & IgG) . If no color in C band and no color in T bands the assay is invalid.

Statistical Analysis: We used statistical Analysis System- SAS (2012) program to identify the effect of differences features in the parameters of this study, and the test for Chi-square was used to significant contrast between a probability percentage of (0.05 & 0.01) in present study[6].

3. Results

Present results showed according to types antibodies in females dealing with animals and those do not by using Rapid serological test that (1) sample out of 30 (11.11%) IgG positive in females dealing with animals and (3) samples out of 30(14.29%) IgG positive in females those do not dealing with animals and the results for type IgM antibodies was negative to all thirty samples.

Table 1: Distribution of samples study according to IgG test of Toxo

IgG	No	Percentage (%)
Positive (+ve)	4	13.33 %
Negative (-ve)	26	86.67 %
Total	30	100%
P-value	---	0.0001 **
** (P≤0.01).		

Table 2: Distribution of samples according to IgM test of Toxo

IgM	No	Percentage (%)
Positive (+ve)	0	0.00 %
Negative (-ve)	30	100 %
Total	30	100%
P-value	---	0.0001 **
** (P≤0.01).		

Table 3: Distribution of samples according to Samples Dealing with and without animals

Samples	No	Positive (+ve) No (%)	Negative (-ve) No (%)	P-value
With animals	9 (%)	1 (11.11%)	8 (88.89%)	0.0001 **
Without animals	21 (%)	3 (14.29%)	18 (85.71%)	0.0001 **
Total	30	4	26	---
P-value	---	0.327 NS	0.327 NS	---
** (P≤0.01), NS.				

Note: ** mean highly significant (P≤0.01) and NS mean non-Significant.**

statically analysis of the results for Toxoplasmosis according to IgG antibodies in the table (1) showed that the positive percentage was (13.33%) and negative percentage was (86.67%) and the differences between this percentages was highly Significant represented (P≤0.01).While statically analysis of Toxoplasmosis results according to IgM antibodies in the table (2)showed that positive percentage was (0.00 %) and negative percentage was (100%) the differences between this percentages was highly Significant represented (P≤0.01). Finally the outcomes for Toxoplasmosis in table (3), horizontally indicated that highly Significant (P≤0.01) between this percentages in both females dealing with animals or without, while vertically showed that no Significant differences(6).

4. Discussion

Toxoplasma gondii Clinical signs cannot be identified because of no specific nature of the signs, requiring laboratory testing [7]. The validity test of Toxo IgG/IgM Combo Rapid test was done in this study via CTKBiotech Inc, CA, USA rapid test (onsite Toxo IgG/IgM combo) techniques . Results for Toxoplasmosis according to IgG antibodies in the table(1)showed that the positive percentage was (13.33%) and negative percentage was

(86.67%) the difference between this percentages was highly Significant represented (P≤0.01), while Toxoplasmosis results according to IgM in the table(2) showed that the positive result was (0.00%) and the negative result was (100%).These results demonstrate that there were chronic infections represented by IgG results whereas there were no acute infections represented by IgM results. This study agree with the low percentage of IgM (2%) for toxoplasmosis in women in Al-anbar Province [8].In the other study, toxoplasmosis infection in Najaf and Misan governorates was 20 %[9]. Also the percentage of toxoplasmosis chronic infection was (30.76%) contrast with (11.92%) acute type [10]. Moreover there is demonstrated study confirm high prevalence of chronic toxoplasmosis (31.70%) contrast with acute infection of toxoplasmosis which were (24.39%) [11]. the differences in infection rates in our study and the other studies are explained as there are many factors can affect the infection rate primarily the difference in the sample size, geographical locations and the quality of the test *Toxoplasma gondii* can infect women who do not deal with animals and this is interpreted as that the infection could be transmitted to human from another sources such as contaminated food and water with oocyst of *Toxoplasma gondii* parasite.

5. Conclusion

We conclude that *Toxoplasma gondii* can infect women who do not deal with animals Despite of the domestic animals are considered as carrier host to the humans and incidence of toxoplasmosis for individuals . Also ,present study appear that Toxoplasma rapid test has important role in clinical applications as it is easy , rapid, not expensive to perform and dependent test to identify infections.

References

[1] Nelson, KE, Williams CM, editors. Infectious disease epidemiology: theory and practice. Jones & Bartlett Publishers; 2014.

[2] Harba M H, Amira F A. Evaluation of DNA damage by DNA fragmentation and comet assays in experimental Toxoplasmosis with virulent strain.

[3] Aspinall, TV, Marlee D, Hyde JE, Sims PF. Prevalence of Toxoplasma gondii in commercial meat products as monitored by polymerase chain reaction–food for thought?. International journal for parasitology. 2002 Aug 1;32(9):1193-9.

[4] Singh, S, Munawwar A, Rao S, Mehta S, Hazarika NK. Serologic prevalence of Toxoplasma gondii in Indian women of child bearing age and effects of social and environmental factors. PLoS neglected tropical diseases. 2014 Mar 27;8(3):e2737.

[5] Pishkari S, Shojaee S, Keshavarz H, Salimi M, Mohebali M. Evaluation of Toxoplasma gondii soluble, whole and excretory/secretary antigens for diagnosis of toxoplasmosis by ELISA test. Journal of Parasitic Diseases. 2017 Mar;41(1):289-91.

[6] SAS. J Statistical Analysis System, User's Guide. Statistical. Version 9.1th ed. SAS. Inst. Inc. Cary. N.C. USA. 2012

[7] Tenter AM, Heckeroth AR, Weiss LM. Toxoplasma gondii: from animals to humans. International journal for parasitology. 2000 Nov 1;30 (12-13):1217-58.

[8] Alouci MM. Serologic Study for TORCH Infection in Women with Bad Obstetric History in Al-Anbar Province (IRAQ). Egyptian Academic Journal of Biological Sciences, G. Microbiology. 2018 Jun 1;10(2):9-4.

[9] Saheb EJ. The prevalence of parasitic protozoan diseases in Iraq, 2016. Karbala International Journal of Modern Science. 2018 Mar 1;4 (1):21-5.

[10] Huda Ali Salih. Prevalence of toxoplasmosis among pregnant women in Najaf city. *Kufa J Vet Med Sci*. 2010 ,volume **1**,pages 8-101.

[11] Al-Warid HS, Al-Qadhi BN. Evaluation of progesterone and estrogen hormonal levels in pregnant women with toxoplasmosis. European Journal of Scientific Research. 2012 Dec;91 (4):515-9.