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Prevalence of toxoplasmosis among miscarried women and the effect on embryo in Thi -Qar province southern – Iraq

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***Abstract*— Toxoplasma gondii is a widespread worldwide and is one of the causes of miscarriage in women who are pregnant .Toxoplasma gondii infection among miscarried women in Thi-Qar province was investigated in this study. A total of 120 blood samples of aborted women and 80 samples of blood were taken from women who had not undergone miscarriage while pregnant (comparison group) and for the period from November 2018 to January 2019 and with ages ranging from 15 to 44 years. Anti-Toxoplasma IgM and IgG antibodies were detected using an enzyme-linked immunosorbant assay (ELISA).The results showed that the total incidence of T. gondii among women with miscarriage was 59/120 (49.1%) compared with the standard group (women without miscarriage) 5/80 (6.2%). The rate of infection was IgG 41.6%, IgM 5% and IgG & IgM togather 2.5% among miscarried women. The age group with the highest percentage was the range of (25-34) year ,was(45.7%) and the lowest percentage was 22 % in the range of (35-44)year age range. The highest rate of infection was in the first period of pregnancy 52.5% and the lowest was in the third period of pregnancy 18.6% women who had a single miscarriage have the highest prevalence of infection (44%) and the lowest was in women who have multiple miscarriage (23.7%).**

Keywords— Toxoplasmosis , Toxoplasma gondii , Prevalence , miscarriage women , Thi –Qar province , effect on embryo

I. INTRODUCTION

Pregnancy in humans is divided into three trimester , The first part includes fertilization, growth of the central nervous system, brain development, as well as the organogenesis process of other systems . The second and third parts of pregnancy, there is growth in the organs and an increase in the weight of the fetus (Sadler,2012).

The effect of the Toxoplasmosis on the human embryo at the beginning of pregnancy is almost non-existent or little, except in the case of infection before pregnancy for the last three months, For the pregnant women who are infected, the risk of newborn infection with hydrocephalus, microcephaly, retinochoroiditis, blindness, epilepsy, psychomotor and mental retardation, and anemia is very likely to occure . (Chaudry et al.,2014) , Infection often results in severe central nervous system disease and fetal miscarriage in the first three months of pregnancy . (Hee seo et al.,2020)

Toxoplasmosis is a zoonotic disease caused by Toxoplasma gondii, an intracellular parasite that has spread throughout the world. that affects almost all animals with warm blood and takes cats as final host (Nelson and William, 2014).

The Cats are definitive hosts for this parasite, whereas intermediate hosts include humans, a wide range of animals, birds, and rodents (John and Petri, 2006). To complete its sexual and asexual reproduction phases in the life cycle, T. gondii requires both a final and intermediate host. (Montoya and Liesenfeld, 2004).

The two main modes of infection are , swallowing of an infected meat tissue cysts and oocyst from food, soil or water that has been tainted cat stool (Montoya and Remington, 2008). T. gondii can be transmitted through blood transfusions and organ transplants on a rare occasion (Singh, 2003). Toxoplasmosis in people with immunocompetent are usually without symptoms or limited symptoms. Fever, malaise, and cervical lymph node enlargement are among of the symptoms. (Daryani et al., 2010), while in patients with immunocompromised the parasite cause severe symptoms including spleenomegaly, choeioretinitis, Pneumonitis, Encephalitis and even death (Montoxa and Liesenfeld,2004).

This parasite is particularly important during pregnancy because it can pass the placental barrier and infect embryonic tissue, resulting in congenital abnormalities. The parasite can cross the placenta if it is acquired during pregnancy as a primary infection, resulting in spontaneous miscarriage, baby death in the uterus, or severe congenital

abnormalities, hydrocephaly, mental retardation, and chorioretinitis are some of the conditions that can occur (Sukthana,2006). The risk of infection to the embryo is low in the early stages of pregnancy, but in the later stages of pregnancy, the impact of infection is more dangerous if the necessary treatment is not taken (Chaudry et al.,2014) The aim of this study was to use ELISA test to evaluate the prevalence of anti-Toxoplasma antibodies (IgM and IgG) in abortive women in Thi-Qar province and to look into the association between Toxoplasmosis (Acute and Chronic) and some variables.

II. MATERIALS AND METHODS

The current study included (120) miscarried women and reviews to some private clinics for gynecology in Nasiriyah City (the center of Thi-Qar province) for the period from November 2018 to January 2019 and with ages ranging from 15 to 44 year . Using disposable syringes five milliliter of blood from redial vein were taken from each women . The blood samples were placed in a sanitized plain tube and allowed to coagulate for thirty minutes at room temperature , The serum was then centrifuged for 10 minutes at 3000 rpm to collect it, which was then divided into three eppendrof tubes with a micropipette and stored at -20°C until it was utilized for ELISA IgM and IgG assays.

Detection of Anti- T. gondii Antibody (IgG) by Enzyme linked Immunosorbent Assay (ELISA)

The bioCheck Toxoplasma IgG ELISA (BC-1085) kit (U.S.A.) was used The Toxoplasma IgG ELISA is intended to evaluate a patient, serologic status to T. gondii infection.

Principle

Purified T.gondii antigen (Ag) is coated on the surface of micro wells. Diluted patient serum was added to the wells, and the T.gondii IgG- specific Ab, if present, will bind to the Ag. All unbound materials were washed away. Horse radish peroxidase (HRP) conjugate is added, which binds to the Ab-Ag complex. Excess HRP-conjugate is washed off and solution of tetra methyl benzidine (TMP) reagent was added. The enzyme conjugated catalytic reaction is stopped at a specific time. The color intensity generated is proportional to the amount of IgG –specific Ab in the sample.The results were read by ELISA reader

Detection of Anti-T. gondii Antibody (IgM) by Enzyme linked Immunosorbent Assay (ELISA)

The bioCheck Toxoplasma IgM ELISA (BC-1087) kit (U.S.A.) was used .The Toxoplasma IgM ELISA is intended for using in detection of IgM status to T.gondii in human serum.

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III. RESULTS

The seroprevalence of IgM, IgG and IgM and IgG together anti-Toxoplasma-antibodies among miscarriaed women were 6/120 (5%), 50/120 (41.6%) and 3/120 (2.5%) respectively. While among women non- miscarriaed were 0/80 (0%), 5/80(6.2 %) and 0/80(0%) respectively. However, the overall seroprevalence of anti-Toxoplasma-antibodies was 59% among miscarriaed women and 6.2% among non- miscarriaed women. Table (1)

TABLE I . ANTI –TOXOPLASMA ANTIBODY SERPREVALENCE IN BOTH MISCARRIAED AND NON – MISCARRIAED WOMEN.

Study Groups	No. of Sample	IgM		IgG		IgM & IgG		Total	
		No.	%	No.	%	No.	%	No.	%
Aborted women	**120**	**6**	**5**	**50**	**41.6**	**3**	**2.5**	**59**	**49.1**
Non-aborted women	**80**	**0**	**0**	**5**	**6.2**	**0**	**0**	**5**	**6.2**
Total	**200**	**6**	**3**	**55**	**27.5**	**3**	**1.5**	**64**	**32**

In the current study, it was discovered that the Toxoplasmosis morbidity among miscarriaed women was greater in the age range of 25-34 year at 45.7 %.while the lower morbidity was in the age group between 35-44 year was 22% ,

TABLE II . DISTRIBUTION OF ANTI-TOXOPLASMA ANTIBODIES AMONG AMISCARRIAED WOMEN ACOORDING TO THE AGE

Age group	Positive anti-T-antibodies	
	No.	%
15-24	19	32.2
25-34	27	45.7
35-44	13	22
Total	59	100

In Table (3) time of abort miscarriage was classified as occurring during the first, second, or third trimester. There is a relationship between the time of an abor miscarriage and the percentage of infection with anti-Toxoplasma -antibodies ,The percentage of positives in the first trimester was 52.5% higher than the others .

TABLE III . DISTRIBUTION OF ANTI-TOXOPLASAM ANTIBODIES IN MISCARRIED WOMEN ACCORDING TO MICRRIED TIME

Abortion time	Positive anti-T-antibodies	
	No.	%
First Trimester	31	52.5
Second Trimester	17	28.8
Third Trimester	11	18.6
Total	59	100

In Table (4): distribution of anti-Toxoplasma-antibodies among miscarried women according to the miscarriage number. The higher percentage of infection was in single miscarriage was 44% while the lowest percentage was in multiple miscarriage was 23.7%.

TABLE IIII . DISTRIBUTION OF ANTI-TOXOPLASMA ANTIBODIES AMONG MISCARRIED WOMEN ACCORDING MISCARRIAGE NUMBER.

miscarriage Number	Positive anti-T-antibodies	
	No.	%
Single miscarriage	26	44
Double miscarriage	19	32.2
Multiple miscarriage	14	23.7
Total	59	100

III. DISCUSSION

In the current study out of 200 sample 64(32%) Anti-Toxoplasma antibodies were to be positive .In miscarried women the percentage of infection was IgG (41.6%), IgM (5%) and IgG and IgM together (2.5%) while in non-miscarried women was IgG 6.2%, IgM (0%), IgG and IgM together (0%).

The seroprevalence of IgG Toxoplasma was 48 % in 50 miscarried women with a history of spontaneous recurrent miscarriage in Baghdad City, whereas IgM was 4 %. according to a study conducted by Shallal (2013), the results of this study are similar to the results of the current study. According to Juma and Salman (2011), the prevalence of Toxoplasmosis was determined to be 21.67 % among women who had miscarriage at Al-kadhimia Teaching Hospital in Baghdad, Iraq. *Toxoplasma gondii* prevalence rates vary among women in different countries depending on climate conditions, dietary and health habits, socioeconomic situation, educational attainment, and age.

This study found that the age bracket (25-34) has the highest incidence of infection and the age bracket (35-44) has the lowest rate of infection. The high rate of seroprevalence in the 25-34 age bracket may be due to increased interacting with cats of infected objects and vegetables than the other age bracket (Hadeel *et al*., 2016). This finding is comparable to that of Fallahi *et al*. (2009), who found a high rate of seropositivity in the 25-30 age range in Iran.

In terms of miscarriage timing, the current study found that women who had miscarriage during the first trimester of pregnancy had a higher incidence rate, This agree with the findings of Hadeel *et al*. (2016) in Qadisiyah Province and Addory (2011) in Salah Aldden Province, this is consistent with the idea that the severity of injury during pregnancy is determined by the degree of fetal resistance as well as the immune system acquired spontaneously through the placenta.

As a result, during the first trimester of non-immune system completion, the fetus is more prone to infection (Ali and Rashid, 2009).

The recent study found that women who had a single miscarriage had the highest rate of infection. The results of the current study agree with the results of Hadeel *et al.* (2016) and Al-kashab (2009). The explanation for the high prevalence among miscarried women could be related to the type of acute or reactive ate chronic injury caused by the expectant mother's body's decreased immunity, as the period of the injury during pregnancy has a significant influence in

determining the fetus' fate (Al-kashab, 2009) . It was also observed that women infected with toxoplasmosis in the early stages of pregnancy have a lower risk to the embryo than in the late stages of pregnancy if the miscarriage is not happen , This is consistent with what Chaudry *et al.* (2014) mentioned that the parasite transmission rate is less than 6% in the first months of pregnancy, and the transmission rate is 60% or 80% in the later months of pregnancy.

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