

Seroprevalence of toxoplasmosis among aborted women and level of IgE and IFN- γ in chronically infected of them .

G. N. AL-Mousawi* and W. S. Shani** .

*Primary Health Care Department

**Biology department , College of Science , University of Basrah , Basrah

Abstract:

Current work was carried out to study seroprevalence of toxoplasmosis among sixty five aborted women by using VIDAS technique and the correlations between toxoplasmosis in those women and some factors like age and locality . In addition the goal of recent research was to measure the level of IgE and IFN- γ cytokine in sera of chronically infected women by using ELISA in comparison with control group .

The results indicated that the highest prevalence(52.3 %) with toxoplasmosis were in the age group (21-30) and those who lived in city center (56.9%) .

A statistical analysis showed a high difference ($p < 0.01$) in mean level of IgE between patients(377.7)Iu/ml and control group (70.88) Iu/ ml.

The mean level of IFN- γ was also showed high statistical differences($p < 0.001$) between patients(6.5023) pg/ml and control group (0.9072) pg/ml .

1-Introduction :

Toxoplasmosis is an important parasitic infection of human and animals caused by *Toxoplasma gondii* . It is well known that the progression and severity of disease depend on immunological status of the host and the genetics of the parasite can also play a role in the infection (Switag *et al.*,2005) .

Toxoplasma infection at human typically produce only mild clinical symptoms and about 80% - 90% of infection are asymptomatic . The mild symptoms including headache , muscle pain , sore throat , low grade fever for one or several weeks and lymphadenopathy will progress to a chronic state when the tachyzoites continue to destroy

cells causing extensive lesions in the lung , brain , eyes , liver and heart (Smith,2001) .

Early studies demonstrate the ability of *T.gondii* to activate cells from the innate compartment of the immune system such as macrophages (Scharton-Kerston *et al.*,1996) , dendritic cells (Sousa *et al.*,1997) , and neutrophils (Bliss *et al.*,1992) resulting in the production of IL-12 and TNF- α which limits parasite replication (Gazzinelli *et al.*,1993; Khan *et al.*,1994 ;Scharton-Kerston *et al.*,1996)

Recent study designed to focus a light on prevalence of toxoplasmosis in aborted women and because no or little research focusing on study the role of IFN- γ and IgE during chronic stage of disease recent work directed to measure the level of IFN- γ and

IgE in aborted women during chronic toxoplasmosis .

2-Materials and Methods:

Blood samples collection

A blood samples were collected from 65 women examined by the senior gynecologist and referred to the department of primary health care in Basrah . Each patient was interviewed and dates were listed in a specially constructed protocol which was conducted according to age and location .

Sera obtained by centrifugation at 1500 rpm for 5 minutes , then tested by Enzyme linked fluorescent assay (ELFA) technique (VIDAS) to detecte the infection with *T.gondii* . The detection of acute and chronic cases were done by using (IgM and IgG) of the same technique .

Control group : Twenty five blood samples were collected from women who apparently healthy by physician examination and negative results of (VIDAS) technique .

All sera were stored at -20 c° until used the age of studied groups ranged (15-50) years .

Detetion of anti-Toxoplasma gondii total immunoglobulin (Ig) IgG and IgM in serum .

The detection of anti *T.gondii* total Ig, IgM and IgG was done by using VIDAS Toxo competitor (TXC) (TXM) and (TXG) kit from Biomerieux (France).

TOTAL Ig	IgG	IgM
<1.6 positive	<0.55 negative	< 4 negative
≥1.6negative	0.55-0.65 equivocal	≤ titer <8 equivocal
	≥ 0.65 positive	≥ 8 positive

Interpretation of results

Interpretation of results was depending on the following table which mentioned as in kit.

Quantitative assay for total IgE and human IFN- γ in aborted women with chronic *T.gondii* infection .

This study was performed by measuring the concentration of serum IgE and IFN- γ in chronically infected aborted women and control group by using ELISA technique .

Quantitation of total IgE and human IFN- γ were done by using a kits from GENESIS (united kingdom) and Bender Med system Austria respectively .

Calculation of results

The results obtained by drawing a standard curve made by plotting the absorbance for each standard concentration on the vertical axis against IgE and IFN- γ (each one alone) on the horizontal axis , the concentration of IgE and IFN - γ for each sample were determined .

Statistical analysis

Data was analyzed by using the statistical pakage for social sciences (spss) as well as t-test , chi-square . (Walpol,1982) .

3. Results

1-The results of the serodiagnosis of toxoplasmosis by the VIDAS technique showed that all sera obtained from 65 women had a positive titer of IgG antibodies , but they were showed a positive IgM titer table (1) .

2-The prevalence of infection was higher 34 (52.30%) in patients with an age group (21-

30) in comparison with the other age groups with significant differences ($p < 0.05$) tabl (2)

3-High significant differences ($p < 0.0001$) were recorded in the percentage of toxoplasmosis at the center of Basrah (Al-Qibla , Hay Al-Hussain , Al-Jumhuria) 37(59.9%) in comparison with other location . table (3) .

4-The present data revealed that were there highly significant differences ($p < 0.01$) in mean concentration of serum IgE between patients (377.7) Iu/ml and the control group (70.88) Iu/ml tabl (4) .

5-High statistical differences ($p < 0.001$) were recorded in the mean concentration of serum IFN- γ in patients (6.502) pg/ml when compared with its mean concentration in sera of control group (0.907) pg/ml table (5).

Table (1) : classes of immunoglobulines in patients sera detected by VIDAS technique

Imunoglobulines	Positive cases	Negative cases
Total Igs	65	0
IgG	65	0
IgM	0	65

Table (2) : Distribution of toxoplasmosis patients according to age group

Age	No.of patients	Pereantage %	chi-square	p.value
15-20	7	10.8	5.542	$p < 0.05$
21-30	34	52.3		
31-40	21	32.3		
41-50	3	4.6		
Total	65	100		

Table (3) : Distribution of toxoplasmosis among 65 patients according to locality

Locality	No-of patients	Percentage %	chi-square	p.value
1. Center of Basrah	37	56.9	100.738	0.0001
2. Qurna	6	9.2		
3. Um-Qasir	2	3.1		
4. Abo Al-Khasseb	3	4.6		
5. Shatt Al-Arab	2	3.1		
6. Al-Hartha	6	9.2		
7. Al-Midayna	9	13.8		
Total	65	100.0		

Table (4) : Mean concentration of IgE (Iu/ml) in sera of 65 patients with toxoplasmosis and control group

Groups	No.	Range	Mean Iu/ml	S.D	S.E	T.value
Patients	65	195-1240	377.7	347.921	43.15	5.79
control	25	22-146	70.88	48.946	9.789	

Table (5) : mean concentration of serum IFN- γ (pg/ml) in 65 patients with toxoplasmosis and control group .

Groups	No.	Range	Mean Iu/ml	S.D	S.E	T.value
Patients	65	4.11-15.28	6.5023	2.1437	0.2496	22.41
control	25	0.32-1.22	0.9072	0.2698	0.054	

4- Discussion

The present seroprevalence study demonstrates that all of the aborted women had IgG antibodies . The high prevalence of anti-toxoplasma IgG in patients women appears to be a reflection of a chronic stage and indicative of a previous infection that might have origination with cat faeces or eating uncooked meat . Results are similar to those reported by (Jumaian, 2005) in Jordan .

The prevalence of toxoplasmosis was higher in (21-30) age group and this many be related to the fact that marriage and pregnancy have mostly occurred at this age group especially in eastern countries like Iraq . The results were in agreement with (Shani ,2004) . The data showed that the rate of infection declines in other age , this finding is in disagreement with results reported in studies done in some other countries and indicated that *Toxoplasma* infection increased with age (El-Hady,1999;Bobic *et al.*,1998) , and these differences may be attributed to the variation from country to country and also between different population within the country (Jackson *et al.*,1987) .

According to the prevalence of disease in locality , it appears that the center of Basrah showed highly signification differences in comparison to other districts , may be due to that the center of Basrah includes areas with a low socioeconomic status and a bad sanitation . This finding is similar to that which was shown by (Shani ,2004 ; Yasodhara *et al.*, 2004) .

Recent study tried to identify IgE level in women with chronic stage of disease and obtained highly significant differences between the patients and control group in the concentration of serum IgE , this finding was also documented by (Wong *et al.*,1993 ; Valkoun *et al.*,1995; Ashburn *et al.*,1998 and Gomez-Marín *et al.*,2000) , and this increasing in IgE concentration may be related to reactivation of chronic (latent infection) . The work is almost similar to that which was done by (Villena *et al.*, 1999)

The present study is the firstly (in Basrah) conducted to determine the cellular expression of IFN- γ as a T-helper 1(Th1) mediator which may reflect some of the immunological change that occur in aborted women with toxoplasmosis .

Present results showed highly significant differences in the IFN- γ level between patients and control group and this may be because IFN- γ has been shown to play a crucial role in protective immunity against *T.gondii* (Abu-Bacer *et al.*,2004) .

The result matched with those recorded by (Vern & Susuki,2007) , whom mentioned that the major mediator of resistance against toxoplasmosis in controlling the disease and maintain the latency of chronic infection in the brain(Ferro *et al.*,2008) and also indicated the importance of IFN- γ in placental infection by *T.gondii* .

References

- Abu – Baker, A ., Pfaff, A.W., Geroges , S., Letscher–Bru,V., and Filisettid. (2004) . Role of NK cells and gamma interferon intransplacental passage of *T.gondii* in a mouse model of primary infection . *Infect . Immuno.* 72 : 1397 – 1401
- Ashburn, D., Joss, A., Pennington, T., Ho – Yen, D. (1998) . Do IgA,IgE, and IgG avidity tests have any value in the diagnosis of *Toxoplasma* infection in pregnancy ? . *J. Clin. Pathol.* 51 : 312 12 – 315 .
- Bliss,S.K.,Marshall,A.J.,Zhang, Y. and Denkers, E. Y. (1992). Human polymorphonuclear leukocyte produce IL– 12 , TNF – α , and the chemokines macrophage – inflammatory protein – 1 . α and I B in response to '*T. gondii* antigen . *J. Immunol;* 162 : 7369.
- Bobic, B.; Jevremovic, I ., Marinkovic , J. and Sibalic, D. (1998). Risk factors for *Toxoplasma* infection in a reproductive age femal population in the area of Belgrade , Yugoslavia *Eur.J.Epi.*; 14:605-610.
- El– Hady, H. M. (1991) . Toxoplasmosis among pregnantn women in Abha, Saudi Arabia. *J. Egypt : Soc. Parasitol;* 21 (3) : 811 – 816.
- Ferro, E. A., Mineo, J. R., Ieta , F., Bechi, N. and Paulesul,L.(2008).Macrophage migration inhibitory factors is up– regulated in human 1st – trimester placenta stimulated by soluble Antigen of *T. gondii* , Resulting in increased monocyte adhesion on villous explants . *Amer.J.Pathol;*172:50-58.
- Gazzinelli , R. T., Hieny, S , Wynn, T. A ., Wolf, S . and Shen, A. (1993) . Interleukin – 12 is required for the T - lymphocyte - independent induction of INF - γ by an intracellular parasite and induces resistance in T - cell - deficient hosts- *proc Nat Acad Sci . USA.* 90 : 6115 - 6119.
- Gomez – Marin , J. E., Montoya – de – Londono , M. T., Castaro – Osorio, J. C., Heine, F. A., Duque, A. M., Chelma, C., Aubert, D., Bonhomme, A. and Pinon, J. M. (2000). Frequency of specific anti – *Toxoplasma gondii* IgM, IgA, and IgE in Colombian patients with acute and chronic ocular toxoplasmosis. *Mem. Inst. Oswaldo – Cruz;* 95(1):89-94.
- Jackson , M. H., Hutchison , W. M. and SJim, J. C.(1987).

- Seroepidemiological survey of toxoplasmosis in Scotland and England *Annals of tropical medicine and parasitology*; 81 (4): 359 — 365.
- Jumaian , N. F.(2005). Seroprevalence and risk factors for *Toxoplasma* infection in pregnant women in Jordan . *E. M. H. J*; 11 (No. 1 & 2):p1.
- Khan, I.A. Matsuura, T, and Kasper, L. H (1994). IL-12 pregnancy Indian *J.. Med. Microbiol*; 22 (4) : 241 — 143 .
- Scharton – Kersten, T. M, Wynn, T. A, Denkers, E.Y Bala, S, Gtunrald,E. (1996) . In the absence of endogenous IFN – γ , mice develop unimpaired IL – 12 responses to *T . gondii* while failing to control acute infection . *J. Immunol*; 157: 4045 .
- Shani, W. S. (2004) . Humoral and cellular immune response in women afflicted with toxoplasmosis . Ph. D., Thesis. College of Science .Basrah Un .
- Smith , J.F. (2001) *Toxoplasmosis* . Medical Library. www. chc. library. Org.
- Sousa, C. R.; Hieny, S. and Scharton - Kersten, T. (1997) . In vivo microbial stimulation induces rapid CD 40 ligand independent production of I L - 12 by dendritic cells their redistribution to T cells area *J. Exp. Med*; 186 - 189 .
- Switaj , K, Master, A., Skrzypzak, M. and Zaborowski, P. (2005). Recent trends in molecular diagnostics for *T . gondii*. *Clin. Mic*; 11:170-176.
- Valkoun, A., Stefanik, M., Nadvornik, V , Kodym, P. (1995). Diagnosis of acquired toxoplasmosis using simultaneous determination of specific IgA, IgM and IgE . *Epidemiol. Microbiol. Immunol*; 44 (3):107.
- Vern, B., and Suzuki, Y. (2007). Effects of *T . gondii* infection on the Brain . *Schizophrenia Bulletin* (3) : 745 - 751 .
- Villena, D., Brodard, V., Quereux. C., Leroux, B., Dupouy, D., Remy, G., Foudrinier, F., Chemala, C. and Pinon, M. (1999). Detection of specific IgE during Maternal, Fetal, and congenital toxoplasmosis *J. Clin. Mic*; 37 (11): 3487 - 3490 .
- Walpole, R. E. (1982) . Introduction to. statistics 3rd edition. Collier Macmillan Publishing Co. 219.
- Wong S. Y., Hajdu, M. P , Ramirez, R., Thlliez, P., Mcleod, R. and Remington, J. S. (1993) . Role of specific IgE in diagnosis of acute *Toxoplasma* infection and toxoplasmosis. *J. Clin. Microbiol*; 31(11): 2952 -2959 .
- Yasodhara, P., Ramalakshmi, B. A., Lakshami, V. and Krishna TP . (2004) Socioeconomic status and-prevalence of toxoplasmosis during pregnancy Indian *J.. Med. Microbiol*; 22 (4) : 241 — 143 .

الانتشار المصلي المناعي لداء المقوسات في النساء المجهضات ومستوى IgE و IFN- γ في
المصابات اصابة مزمنة منهن

*غالب نوري الموسوي / قسم الرعاية الصحية الاولية

** وفاء سعدون شاني / قسم علوم الحياة/كلية العلوم/ جامعة البصرة

الخلاصة

اجري العمل الحالي لدراسة الانتشار المصلي لداء المقوسات ضمن 65 من النساء اللواتي يعانين من الاسقاط وذلك باستخدام تقنية (VIDAS) ، كذلك دراسة علاقة داء المقوسات في أولئك النساء مع بعض العوامل مثل العمر والموقع . اضافة لهذا فقد كان هدف البحث الحالي هو قياس مستوى IgE والمدور الخلوي IFN- γ في مصول النساء المصابات اصابة مزمنة بداء المقوسات ومقارنتها مع مجموعة السيطرة باستخدام فحص الامتصاصية المناعية المرتبطة بالانزيم ELISA . اكدت النتائج بان اكثر نسبة انتشار لداء المقوسات هو في الفئة العمرية (21-30) وبنسبة (52.3)% وكذلك في اولئك اللواتي من سكنة مركز المدينة وبنسبة (56.9)% وقد سجلت فروقات معنوية عالية في معدل مستوى IgE بين مجموعتي المرضى (377.7) Iu/ml والسيطرة (70.80) Iu/ml . كما ان معدل مستوى IFN- γ قد اظهر فرقاً معنوياً عالياً بين مجموعتي الدراسة المرضى والسيطرة (6.5023) pg/ ml و (0.9072) pg/ ml على التوالي .