

# Seroepidemiological aspects of toxoplasmosis among pre-school children in Najaf Province

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## Abstract

This study was used to detect anti *Toxoplasma gondii* IgG and IgM in serum, the records of 154 patients children at the age of less than six years (pre-school age) attending the hospitals and the private laboratories in Najaf/ Iraq during the period from January 2009 to December 2009 were reviewed. Investigation by using VIDAS technique presence of *T. gondii* antibodies showed that 48% of the patients were infected with the parasite, (27% of male as well as 21% of females) were among the positive cases. The percentage of IgG containing serum (66%) was more those contained IgM (34%). The hematological aspects have some relationship with toxoplasmosis, erythrocytes sedimentation rate, showed a marked increasing level, low concentration of hemoglobin and high white blood cells count. The test for toxoplasmosis during childhood and pre-marriage age especially for girls should be a compulsory test to eliminate or limit the adverse effect of this infection during adulthood.

## Introduction

Toxoplasmosis is caused by intracellular parasite *Toxoplasma gondii* (Hökelek, 2005). Infection may be acquired by contact with cat feces containing oocyst (Cook *et al.*, 2000), and by ingestion of raw or undercooked infected meat, and through the placenta (transplacental transmission) from an infected mother to her fetus, and via tachyzoite contained in blood products, tissue transplant, and unpasteurized milk (Pelloux *et al.*, 1997). In most acute infection, the symptoms may be associated with fever, headache, muscle pain, anemia, and sometimes lung complications (Kean *et al.*, 1969). In Iraq many studies were accomplished concerning the seroprevalence of toxoplasmosis by using different techniques in different parts of Iraq by many workers, Al-Kalaby (2008); Khalil (2008) and Al-Mousawi (2008) found the incidence rate in aborted women in Najaf, Baghdad and Basrah was 31.9%, 25% and 26.1% respectively. Toxoplasmosis is well defined illness of adult women as well as men, yet very little is known about the prevalence of the disease in pre-school children, in addition to some hematological measurement which was showed a marked relationship with toxoplasmosis, a matter the researchers tried to tackle and solve.

## Materials and methods

Blood samples were collected from a total of 154 children aged from one month to six years old attending the hospital and the private laboratories in Najaf/ Iraq during the period from January 2009 to December 2009. These patients were suffering from different clinical symptoms such as painful, swollen lymph glands in the cervical, supraclavicular and inguinal regions. These symptoms may be associated with fever, headache, muscle pain, anemia and sometimes lung complications and their mothers with history of abortion. Sera were obtained according to Stewart and Koepke (1987). For hematological test, blood collected by vein puncture, in EDTA tube (Bachner, 1987). Detection of acute and chronic cases were done by means of enzyme linked

fluorescent assay for detection anti - *Toxoplasma* (IgM and IgG) in serum (VIDAS TOXO IgM and IgG, Biomerieux, France) as recommended by the manufacturer.

**Results :-** The results showed clearly that 74 (48%) of individuals participated having toxoplasmosis, among those 41 (27%) were male and 33 (21%) were female (table-1), beside that 20 serum sample were collected from apparently healthy individuals (10 samples for each sex) they served as a control group. The percentage of IgG containing serum was 66% that were more than those contained IgM (34%) in all patients sera which were examined.

**Table 1: Frequency of toxoplasmosis among patients according to sex.**

No. of Patients	Frequency of positivity	Total Percentage(%)	Percentage (%)	
			Male	Female
154	74	48	27	21

**Table 2: Frequency of immunoglobulins in patients' sera detected by VIDAS technique.**

No. of Patients	Frequency of positivity	Total		Percentage (%)		Mean value ±	
		Male	Female	IgM	IgG	IgM	IgG
154	74	41	33	34	66	1.6± 0.3	24.8±2.5

There were no significant differences between the percentages of positivity either in concentration of IgM or IgG among both sexes. About 31% of all positive cases have IgM antibody among male patients (table – 3), 12.5% of them fall in a category of one year of age and 10.2% fall in category of four years

**Table 3: Immunoglobulins in patients' sera detected by VIDAS technique according to their age and sex.**

Age (year)	Sex	Total samples	Positivity of			
			IgG	%	IgM	%
أقل من 1	Male	11	11	12.5	-	-
1		17	4	4.5	11	12.5
2		12	7	7.9	3	3.4
3		11	7	7.9	2	2.2
4		16	5	5.6	9	10.2
5		12	12	13.6	-	-
6		9	5	5.6	2	2.2
أقل من 1	Female	7	7	10.6	-	-
1		12	5	7.5	5	7.5
2		9	3	4.5	5	7.5

of age, the picture are almost the same in female with a total percent of 25.5, when the patients of category one and two years of age scored the highest percentage among all positive patients, while patients of category six scored the lowest percentage. Same results were obtained as regard to estimation of the concentration of IgG (table-3). Hematological parameters (table-4) showed that the erythrocyte sedimentation rates (ESR) values were more increased among male subjects (87.8%) than female (78.7%). The hemoglobin concentration was decreased in male that 82.9% of them showed lower values of Hb. (less than 11g/ dl) compared to female subject who showed that 63.6% of them having low Hb values. On the other hand WBCs count showed that most of patients from different sexes have normal WBCs count.

3		12	7	10.6	2	3.0
4		10	5	7.5	3	4.5
5		11	7	10.6	2	3.0
6		5	3	4.5	-	-

ESR		Total	P- value	
			< 0.05	
Abnormal	Normal	41 ± 2.8	5 ± 2.1	7 ± 1.4
		36 ± 3.6	26 ± 2.9	33 ± 4.3

**Table 4: Mean value  $\pm$ SE of some hematological parameters in toxoplasmosis patients.**

Sex	WBCs		Total	Hb		Total
	Abnormal	Normal		Abnormal	Normal	
Male	4 $\pm$ 1.6	37 $\pm$ 2.1	41 $\pm$ 3.6	34 $\pm$ 4.2	7 $\pm$ 2.3	41 $\pm$ 4.8
Female	7 $\pm$ 3.2	26 $\pm$ 2.2	33 $\pm$ 2.8	21 $\pm$ 3.8	12 $\pm$ 1.5	33 $\pm$ 3.9

**WBCs** : White Blood Cells.

**Hb** : Hemoglobin.

**ESR**: Erythrocyte Sedimentation Rate.

## Discussion

The dissemination of toxoplasmosis among children of both sexes has not been talked in detailed in Iraq; most of the work was concentrated on the study toxoplasmosis in pregnant women, and it's possible prevalence to abortion. The total prevalence rate of toxoplasmosis among children in Najaf/ Iraq was in a range of 48. Male patients showed higher seropositivity to toxoplasmosis (27%) than female (21%), this result was in agreement with Saleh (2005). The high concentration of IgG antibody in a high percentage of patients participated in this research means that the infection is either chronic or some of IgG antibody has been transferred from mother to fetus through placenta (Remington and Dismonts, 1983), since 23.1% of all patients (male and female) below one year of age having IgG antibody for toxoplasmosis and that could explain as IgG antibody is the only globulin that can be transferred through placenta to the fetus (Mckerrow and Heyneman, 1994), this results is in agreement with a survey for toxoplasmosis antibodies, was done in Indonesia by Konish *et al.* (2000), reported the overall prevalence was 58% and with significant differences between male (36%) and female (52%), although antibody prevalence at 0-9 years were more than 50% in males or more than 40% in females. Also we can put an explanation for the elevated percentage of IgG antibody toxoplasmosis in children of age in both categories (male and female) on the basis of the prolonged existence of IgG in the serum patients (Warren, 1993), or it is due to previous exposure to the parasite (Wilson, 1991). Interestingly, patients of 1-4 years of both sexes having the highest percentage of IgM antibody which means that they have recently been exposed to the parasite that may lead us to conclude that patients of less than one year of age having their globulin from infected mother (IgG) and as the age is going on and exposure to the parasite is high, then the percentage of IgM antibody is increasing obviously proportionally with age, this may be alien with Wyler (1993) and Mohan *et al.* (2002). The hematological parameters cleared out that ESR has a great relationship with toxoplasmosis among male subject and to some extent to female subject, though we cannot give absolute conclusion for this result, since ESR is not specific test for toxoplasmosis (Gallin *et al.*, 1992), since it may increase significantly in so many pathological disorder (Daice and Lewis, 1991). WBCs count included is not relevant to toxoplasmosis and this is in consistence with William *et al.* (1995). Nevertheless, hemoglobin concentration indicates significant relationship with toxoplasmosis in both sexes, yet we cannot depend on that idea because it is not known that toxoplasmosis may interfere with hemoglobin concentration except few cases when bone marrow is involved and that needs prolonged exposure to *T. gondii*, a matter that we could not confirm (Wilson and Mcauley, 1999).

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**Statistical Analysis:** the data were analyzed using the available soft – ware package. The Data were analyzed by using analysis of variance (ANOVA) test taking  $P < 0.05$  as the lowest limit significance. These manipulations were carried according to statistical analysis system (SAS, 2001).

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مظاهر الوبائيات المصلية لداء المقوسات القندية في الاطفال في مرحلة ما قبل المدرسة في محافظة النجف/ العراق

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#### الخلاصة

في هذه الدراسة، تم التحري عن الكلوبولينات المناعية من نوع G و M في مصل دم المرضى الذين يشك بمجمهم بداء المقوسات القندية عند 154 مريضاً في عمر أقل من ست سنوات (مرحلة ما قبل المدرسة) راجعوا مع أمهاتهم المستشفيات الحكومية والمختبرات الأهلية في محافظة النجف/ العراق خلال الفترة الممتدة ما بين شهر كانون الثاني عام 2009 الى كانون الاول 2009. أظهر الكشف عن أضداد المقوسة القندية عن طريق تقنية مقايسة التشخيص المناعي الحيوي أن 48% من المرضى مخمجين بالطفيلي (27% ذكور و 21% أناث). كانت نسبة تواجد الكلوبولين المناعي من نوع G 66% وهو أكثر من الكلوبولين المناعي من نوع M 34%. أظهرت الاختبارات الدموية علاقة مهمة مع المرض حيث هناك زيادة في سرعة تثفل الكريات الحمر وكذلك تعداد الكريات البيضاء مع انخفاض في كمية خضاب الدم لبعض المرضى وينسب مختلفه. أن مثل هذا الاختبار لداء المقوسات خلال فترة الطفولة وفي عمر ما قبل المدرسة وخصوصاً البنات يعد من الاختبارات الملزمه لأستبعاد أو تقليل الضرر الناتج من الخمج خلال مرحلة البلوغ و الانجاب.