

THE PREVALENCE OF TOXOPLASMA GONDII INFECTION IN HEMODIALYSIS PATIENTS IN THE CAPITAL CITY OF LIBYA TRIPOLI REGION

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Abstract

Toxoplasmosis caused by *Toxoplasma gondii*, which is an obligate intracellular parasite that infects both humans and animals as a zoonotic pathogen widespread in nature. This study aims to determine the prevalence of toxoplasmosis in hemodialysis patients as immune compromised individuals, and to identify risk factors that affect infection rate by using a questionnaire. Serum samples of 270 were collected from hemodialysis patients who attended Airport Road Polyclinic during the first quarter of the year 2020, and who were examined for the presence of antibodies of *Toxoplasma gondii* (Immunoglobulin G) by immunoassay system. The seroprevalence in hemodialysis patients of Toxoplasmosis was (53%). Age, education level, prior knowledge of the disease and hemodialysis disease were statistically significantly associated with infection rates. Gender, contact with cats, housing type and vegetable washing, were not associated with the infection. To conclude, with the publication of health education and disease definition being recorded, infection will be reduced in addition to the number of hemodialysis patients who are susceptible to *Toxoplasma* infection. Therefore, patients undergoing hemodialysis should be screened for Toxoplasmosis test regularly.

Keywords: Toxoplasmosis; *Toxoplasma gondii*; hemodialysis patients; Libya.

Introduction

Toxoplasmosis is a contagious and zoonotic disease caused by an obligate intracellular protozoan parasite *Toxoplasma gondii* (Dubey, 1988). *Toxoplasma* was first discovered in *Gondii*, North African rodent and it is one of the most common parasitic infections human and other warm-blooded domesticated and wild animals.

It has been found worldwide in nearly one-third of the human population. The incidence of infection may vary in different parts of the world. The causes of this variation are environmental conditions, cultural habits, and animal species (Boden, 2005).

T.gondii is transmitted to humans by ingestion of raw contaminated meat, ingestion speculated oocysts in unwashed vegetables or untreated water, contact with cats, and drinking unpasteurized milk. Moreover, it can be transmitted by organ transplantation and blood transfusion (Hill, 2005). *T.gondii* causes serious or even fatal effects on a fetus whose mother first contracts the disease during pregnancy or on an immunocompromised human. When *T.gondii* occurs for the first time during pregnancy, the parasite can cross the placenta, possibly leading to hydrocephalus, intracranial calcification, and chorioretinitis.

The organism of Toxoplasmosis has two parts of life cycle, the sexual part of the life cycle in cats (definitive host), and the asexual part of the life cycle can take place in any warm-blooded animal (intermediate host) (Koppe,1987).

Material & Methods

270 serum blood samples were collected from hemodialysis patients as immunocompromised individuals who attended Airport Road Polyclinic during first quarter of the year 2020. All blood samples and information (a questionnaire) were simultaneously collected.

Approximately 5ml venous blood were collected in sterile conditions and were left to clot for 15-30 minutes to avoid hemolysis. Then the sera were separated into microtubes after centrifugation at 4000 rpm for 5 minutes, and the microtubes were stored at -20 c° until stage of analysis for the presence of antibody of *Toxoplasma gondii* (IgG) by immunoassay system (Beckman coulter).

Data analysis was performed with SPSS (statistical package for social science) version 16 - 2007; statistical significance was taken at $p \leq 0.05$.

Results

Among the 270 tested samples, 143 were positive for specific antibodies IgG, which represent about 53%, as shown in the Table (1) and Figure (1).

Table (1): The Prevalence of *T.gondii*- Specific IgG Among Total Tested Samples.

Total Tested Samples	No. of IgG Positive Samples & %	No. of IgG Negative Samples & %
270	143	127
%	53%	47%

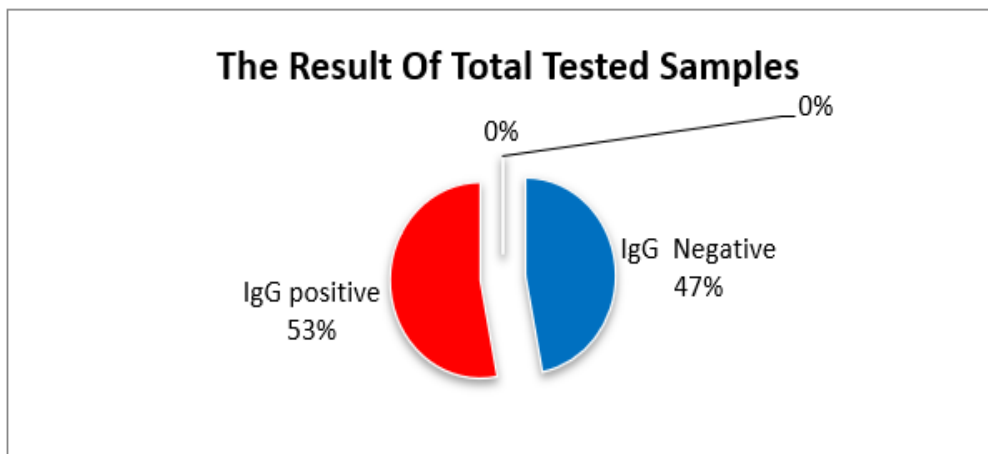


Figure (1): The Prevalence of T.gondii-Specific IgG Among Total Tested Samples.

The positive cases were classified according to age into 7 groups, and the results showed that there was a significant relationship between the positivity and the age of tested samples, the highest antibodies were with the 50-59 age, which is represented in the Table (2) and Figure (2) ($p < 0.05$).

Table (2): The Relation between T.gondii - Specific IgG and the Age of Tested Samples.

Samples	20-29	30-39	40-49	50-59	60-69	70-79	80-89	Total
Positive: No	4	7	31	69	28	3	1	143
%	3%	5%	21%	48%	20%	2%	1%	100%

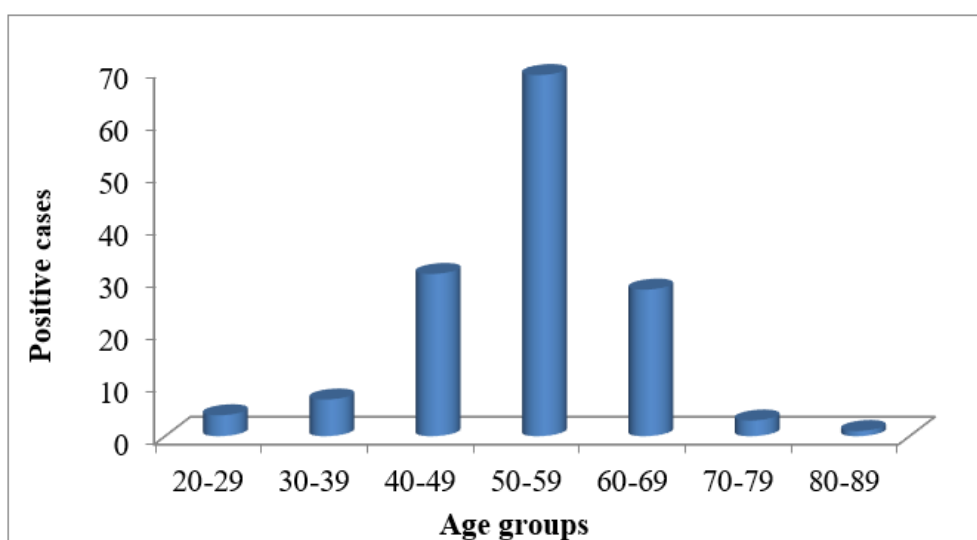


Figure (2): The Relation between T.gondii - Specific IgG and the Age of Tested Samples.

When the positive cases classified according to gender, females were 68% and the male was 32%, these results showed that there was an insignificant relation between the positivity and the gender of tested samples ($p > 0.05$).

Table (3): The Relation between T.gondii - Specific IgG and the Gender of Tested Samples.

Samples	Male	Female	Total
Positive: No	46	97	143
%	32%	68%	100%

By studying the relationship between the T.gondii - specific IgG and the education level of tested samples, the results showed that there was a significant correlation between the positivity and the education level of tested samples ($p < 0.05$).

Table (4): The Relation between T.Gondii - Specific IgG and Study Level of Tested Samples.

Education Level	Below School Age	Basic	Middle	Graduate	postgraduate	Illiterate	Total
Positive: No	3	46	29	13	1	51	143
%	2%	32%	20%	9%	1%	36%	100%

The results also showed that there was an insignificant correlation between positivity and contact with cats, likewise between positivity and housing type as illustrated by Tables (5) and (6) ($p > 0.05$).

Table (5): The Relation between T.gondii - Specific IgG and Contact with Cats.

Samples	Contact with Cats; Yes	Contact with Cats; NO	Total
Positive: No	57	86	143
%	40%	60%	100%

Table (6): The Relation between T.gondii - Specific IgG and Housing Type.

Samples	Housing Type			Total
	House	Flat	House in a Farm	
Positive: No	84	40	19	143
%	59%	28%	13%	100%

While the result revealed that there was a significant correlation between positivity and prior knowledge of the disease ($p < 0.05$).

Table (7): The Relation between T.gondii - Specific IgG and Prior Knowledge.

Samples	Prior Knowledge of The Disease		Total
	Yes	No	
Positive: No	31	112	143
%	22%	78%	100%

The results showed that there was an insignificant correlation between the positivity and vegetable washing ($p > 0.05$).

Table (8): The Relation between T.gondii - Specific IgG and Vegetable Washing.

Samples	Vegetable Washing		Total
	Running	Steeping	
Positive: No	95	48	143
%	66%	34%	100%

Discussion

In this study, a significant correlation was noticed between seropositivity and age ($p < 0.05$); older groups are more susceptible to the parasite than other groups. These results goes with the results obtained in Libya by (Al-zaaiydi, 2007); it was mentioned that infection increased with age and the highest rate of infection was

(69.3%) in 46-50 age group. Analogous results reported in Italy (Valcaviet et al., 1995), United States (Jones et al., 2001), and Saudi Arabia (Al-Harthiet et al., 2006).

This study also revealed an insignificant correlation between the prevalence of *T.gondii* specific IgG and gender. This observation was also reported by other researchers, in Libya by (Al-Jhballi, 2008) (65.7%) in males and (68.1%) in females were infected, in Saudi Arabia by (Al-Qurashiet et al., 2001) (12.0 %) in males and (13.0 %) in females. However, another study done by (Gashoutet et al., 1992) showed that the infection in females (41.13%) was higher than in males (17.87%).

In the present study, there was a significant correlation between seropositivity and education level of tested samples; higher infection was reported in illiterate (36%). The results were similar to another result by (Fallahet et al., 2008) in Iran where the highest prevalence rate observed in illiterate was (61.5%) and the infection decreased in cases with higher educational background than in non-educated cases.

In this study, insignificant relation was found between seropositivity and contact with cats. The previous studies revealed similar results by (Al-Harati et al., 2006). However, result of (Al-Jhballi, 2008), reported significant relationship between positivity and contact with cats.

These results showed insignificant relation between the positivity and the type of housing of tested samples, but samples who live in houses reported higher infection (59%) compared with other samples, this result is consistent with the results made by (Al-Jhballi, 2008).

There was a significant difference between seropositivity and the prior knowledge of the disease. These results are different from those reported by (Al-Harati et al., 2006) and (El-khghag, 2010). Washing vegetables did not any statistical significance. These results are similar to what was reported by (Azbedah, 2009). In this study seroprevalence of Toxoplasmosis in hemodialysis patients was (53%) with statistical significance. This result is lower than those stated in Turkey (56.06%) by (Yazaret et al., 2003), (76.5%) by (Ocak et al., 2005), and in Iran (59.1%) by (Solhjoo et al., 2010). All these studies reported statistical significance. These findings may be due to the hemodialysis patients having immunocompromised and thus susceptible to infection.

Conclusion and Recommendations

This study confirmed that hemodialysis patients are a risk group for infection.

The publication of health education and disease definition will record infection being reduced in the coming years.

Patients undergoing hemodialysis should be screened for toxoplasmosis before hemodialysis to prevent the dissemination of this infection through hemodialysis procedure.

In addition, blood donors should be screened for toxoplasmosis and a routine toxoplasmosis test must be done for all pregnant women.

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