

Anticuerpos Anti-Toxoplasma gondii en donadores voluntarios de sangre en Hospital General de Tijuana, México

Antibodies Anti-Toxoplasma gondii in volunteer blood donors at Tijuana General Hospital, México

Gondii anti-Toxoplasma em doadores de sangue voluntários em Hospital Geral de Tijuana, no México

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Resumen

La toxoplasmosis es una enfermedad parasitaria en humanos, su agente causal, *Toxoplasma gondii*, un parásito protozoo intracelular obligado, es capaz de infectar a los animales de sangre caliente —incluyendo a los seres humanos—, quienes actúan como su huésped intermediario. El objetivo de este estudio fue detectar anticuerpos anti-toxoplasma IgG e IGM, para lo cual se utilizó el método de estudio prospectivo observacional con donadores voluntarios que acudieron al banco de sangre; el estudio de la detección del suero positivo a anticuerpos anti-toxoplasma IgG e IgM se realizó por método de quimioluminiscencia. En los resultados se encontraron personas positivas a los anticuerpos IgG e Ig M respectivamente,

adultos y de ambos géneros, los cuales tienen gatos y perros en sus casas y son residentes de Tijuana que viven en el área urbana. Debido a la seroprevalencia encontrada se recomienda mayor vigilancia con respecto a la presencia de este parásito en hemoderivados.

Palabras clave: *Toxoplasma gondii*, hemoderivados, anti-toxoplasma IgG e IgM, seroprevalencia

Abstract

Toxoplasmosis is a parasitic disease in humans, its causative agent, *Toxoplasma gondii*, a protozoan obligate intracellular parasite, it is capable of infecting warm-blooded animals — including human beings—, who act as its intermediate host. The objective of this study was to detect antibodies anti-toxoplasma IgG and IGM, the prospective observational study method was used with volunteer donors who attended the blood bank; the study of detection of antibody anti-toxoplasma IgG and IgM positive serum was performed by chemiluminescence method. People positive to antibodies IgG and Ig M respectively were found in the results, adult and of both genders, which have cats and dogs at home, and they are Tijuana residents living in the urban area. Due to the seroprevalence found, we recommend greater vigilance with regard to the presence of this parasite in blood products.

Key Words: *Toxoplasma gondii*, blood products, Anti-Toxoplasma IgG and IgM, seroprevalence

Resumo

A toxoplasmose é uma doença parasitária em humanos, seu agente causador, *Toxoplasma gondii*, um protozoário intracelular obrigatório parasita, é capaz de infectar animais de sangue quente, incluindo os seres humanos que atuam como hospedeiro intermediário. O objetivo deste estudo foi detectar anticorpos IgG anti-toxoplasma e IgM para o qual o método prospectivo observacional foi utilizado com doadores voluntários que participaram do banco de sangue; estudo de rastreamento anti-toxoplasma níveis séricos positivo IgM e IgG foi realizado pelo método de quimiluminescência. Eles resultam anticorpos IgG e IgM positivos, respectivamente, adultos e pessoas de ambos os sexos foram encontrados, que têm cães e gatos em suas casas e são residentes Tijuana vivem em áreas urbanas. Porque a

soroprevalência encontrada aumento da fiscalização é recomendada em relação à presença do parasita em produtos sanguíneos.

Palavras-chave: *Toxoplasma gondii*, produtos sanguíneos, IgG anti-toxoplasma e IgM de soroprevalência.

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Introduction

Toxoplasmosis is a parasitic disease in humans, its causative agent, *Toxoplasma gondii*, a protozoan obligate intracellular parasite, it is capable of infecting warm-blooded animals — including human beings—, who act as its intermediate host (Pinto B., 2012).¹

Apparently the human gets infected mainly through direct contact with the ground or accidental ingestion of water or food contaminated with *Toxoplasma gondii* in the form of oocysts that are excreted in cat feces.² Although the parasite remain dormant in people who are immunocompetent, It represents a threat in individuals who are immunocompromised.³

Different authors have reported that this parasite could behave is as opportunistic, because although is keeps latent can migrate and infect different fabrics in situations considered normal, such as pregnancy; in addition, the infection usually appear associated with non-specific symptoms or subclinical, and thus transmitted to the fetus and cause a congenital hydrocephalus, intracranial calcifications and cororetinitis disease.^{4,5}

Eventually, subclinical presentation can develop different disorders at the level of the nervous system, like cerebral toxoplasmosis or psychiatric disorders.⁴

Latent toxoplasmosis is characterized by the presence of the cyst of *Toxoplasma gondii* in different tissues of the host, including the nervous system, and the presence of Toxoplasma IgG antibodies in serum; at this stage it is believed that people remain asymptomatic or present malaise so that infection is not suspected.⁶

Today there are studies that relate the presence of antibodies to *Toxoplasma gondii* with changes in personality and behavior, such as schizophrenia, Parkinson's disease, risk of suicide, depression and bipolar disorder. This is known because of the toxoplasmosis detected by serological studies.^{7,8}

The seroprevalence of toxoplasmosis has been also found in people who have mental retardation in 30.4%, as well as in children with obsessive-compulsive symptoms, where the antibodies IgM and IgG were positive by immunofluorescence tests.^{9,10} To try to understand how the parasite infection of toxoplasma can reach the tissues, studies have been conducted to detect even in human breast milk, finding positive to antibodies of Toxoplasma IgG, IgM and IgA.¹⁴

In Spain, a group of migrant pregnant women were positive for IgG antibodies with 41.4% of seroprevalence: for Latin America and the Caribbean 34.6%, North Africa 33.8%, Eastern Europe 15.7%, Asia 4.7% and Western Europe 3.0%. The study suggests that these women acquired the infection in their countries.¹¹

Infection toxoplasmosis has been linked even with mankind in China, where a prevalence of 10.5% in men and 14.3% among women aged healthy population in Etiopía³ 73.54% in males and 62.74% 12 in women was found in Costa Rica 61.5% male and 55% female, 13 in Tamil Nadu, India 19.12% in males and 9.35% in women, although statistics are not claras.² Multiple serosurveys believe that toxoplasmosis is a highly prevalent infection that reaches 40 to 85% level mundial.^{13,15-17}

In 1992, in northern Mexico 13.5% seroprevalence for toxoplasmosis was reported in population abierta.¹⁸ In 1998 in Yucatan donors reported in men 69% seropositivity to toxoplasmosis.¹⁹ In 2000, the Blood Bank reported only in Monterrey 20% of antibody positivity IgG.²⁰

In 2007, another study in Durango blood bank anti-Toxoplasma IgG antibodies were found in 7.5% with positive IgM and IgG donors with 1.9% .²¹ seroprevalence and epidemiology to *Toxoplasma gondii* infection in the general population and donors blood has been little studied in Mexico.²¹

No investigations in surveillance or screening program in blood donation found in Mexico, so be documented studies showing parasite prevalence in donors sangre.²²

The importance of this zoonoses and its transmission to humans through a variety of routes, including blood transfusion, forced to try to pinpoint the detection of IgG, IgM and IgA to better understand the role of risk factors this parasite, which are currently not at all well

known, as well as environmental influences that promote the spread with the intention of seeking prevention and control of this disease, which most often goes unnoticed due to subclinical presentation. 2. 3

This work aims to detect and quantify Anti Toxoplasma antibodies in healthy donors attending the blood bank of the Hospital General de Tijuana.

Material and method

The study was observational prospective where the sample size considering the total number of donors in 2014. For the realization required the participation of healthy donors Tijuana General Hospital was determined. The inclusion criteria for the study subjects are: 1) voluntary blood donors, 2) over 18 and under 65, and 3) those who agreed to participate in the study.

He is filling a form where data such as age, sex, place of residence (urban, rural) were recorded, if you have pets at home, and informed consent and approval was requested.

For detection of antibodies were collected 3 mL of serum donors, which were used for detection of anti-Toxoplasma IgG and IgM were processed in Access II team: by chemiluminescence method, Beckman Coulter teams have 99.77 % sensitivity and 100% specificity, 5 levels of calibration 0,10.5,50,120,240 and 450 IU / mL, the cutoff for positivity were used with 6 IU / mL for IgG and Nonreactive or greater value to 1UI / mL for consider positive IgM, according to manufacturer's instruction, the calibration was performed with the International Standard WHO Reference TOXS 60, and the data were analyzed with software compatible with Windows SSPS 20V.

Results

525 people registered, but were discarded because they concluded 40 forms and did not cover the requirements of the donation.

So only 485 sera, of which 85 seropositive for anti-Toxoplasma IgG, 4 of them expressed equally IgM seropositive for both antibodies and only 1 donor with IgM, finding a seroprevalence of 17.52% of the population were processed volunteer donors.

IgG positive samples present results with serologic concentrations ranging between 12-499 IU / mL; 50% had concentrations of 6.1-49 IU / mL, 20% 50-100 IU / mL, 16% 101 to 200 IU / mL, 6% of 201-300 IU / ml, and 6% with concentrations greater than 400 IU / mL (table I), finding an average of 98 UI/mL \pm 112 UI/mL.

Table I. Concentration IgG gender and total percentage

IgG UI/mL	Masculino	Femenino	Total	Porcentaje
6.1 - 49	26	15	41	50 %
51 - 99	11	5	16	20 %
100 - 199	11	2	13	16 %
200 - 299	5	0	5	6 %
400 - 499	3	2	5	6 %
Total	56	24	80	

Source: Base de datos estudio Toxoplasmosis, UABC.

Positivity for both IgG and IgM antibodies presented only in 4 samples, and only IgM, representing 1.03% (Table II). Of the total antibody positive people, 68% are males in an age range of 25-55 years with an average of 45 years, 32% females with age range 25-56 years with an average of 41 years.

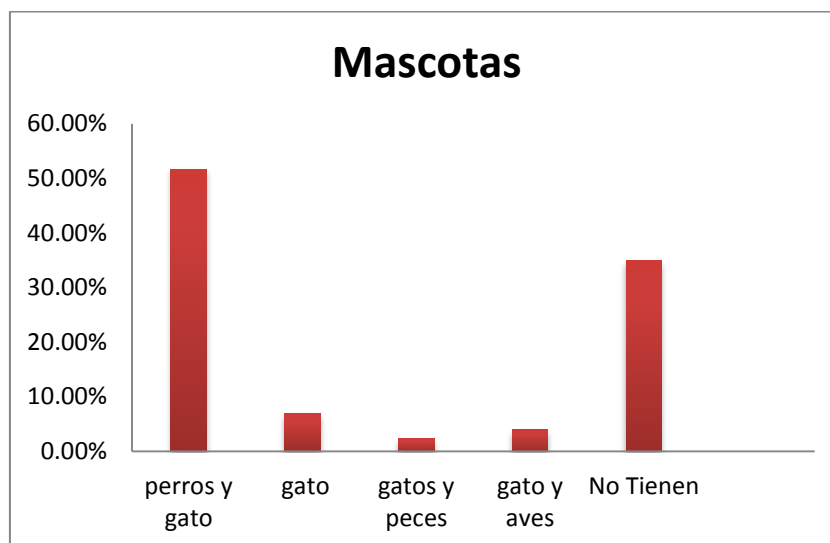
Table II. Antibody levels IgG e IgM

IgG UI/mL	IgM UI/mL	Género	Edad años
176.6	1.1	M	45
96.2	1.1	M	33
-----	5.21	M	59
459.3	1.07	F	29
99.1	1.07	F	44

Source: Study Database Toxoplasmosis, UABC.

The occupation is for employees / workers 56.4%, 6.2% unemployed, housewives 17.6%, profesionistas 16.3% students 3.5% compared to 51.7% have pets cats and dogs, only 7% have cats, 4 % cats and poultry, cats and fish 2.3%, and 35% have (Graph 1).

Graph 1. Pets HIV-positive people anti-toxo IgG e IgM



Source: Study Database Toxoplasmosis, UABC.

Test was performed Chi² to establish association between the presence of antibody and pets finding that there is, with a value for Chi² of 1.39 with 5gl y 95 % confidence. It is worth mentioning that the evaluated donors live in urban areas and are residents with more than 5 years living in the state, 19.91% comes from southern Mexico, 36.31% are from cities in central, 20.21% from other cities in the north while 23.52% were born in Tijuana, Baja California (table III).

Table III. Hometown of people with positive antibodies Toxoplasmosis

Ciudades del Sur	%	Ciudades del Centro	%	Ciudades del Norte	%
Chiapas	3.5	Colima	1.17	Baja California	23.52
Guerrero	5.88	D.F.	5.88	Sinaloa	15.29
Oaxaca	3.5	Guadalajara	7.0	Sonora	1.17
Tabasco	1.17	Hidalgo	1.17	Coahuila	2.35
Veracruz	5.88	Michoacán	5.88		
		Nayarit	12.94		
		Puebla	1.17		
		Tlaxcala	1.19		
Total	19.91 %		36.31 %		43.71 %

Source: Study Database Toxoplasmosis, UABC.

Discussion and conclusion

This work predicts the possibility that it may transfer the parasite at a rate of 17.52% through the different blood products from the blood bank, a result slightly higher than 13.5% for the city in 1992. Although the latter study was conducted in open population 18 the result was low considering the reports for Latin America and the Caribbean, 11 however, must be considered a risk factor for those who receive blood since the recipients of blood products are people with health problems and immunocompromised, as well as pregnant and postpartum women, who can transfer the infection to their babies via milk materna.¹⁴ in this study the presence of positive antibodies were detected in men than in women¹¹ and an association with the presence of pets at home with positivity IgG antibody according to the association showing test Chi.²

By having the resident population over 5 years in the place it can be understood that contact with *Toxoplasma gondii* may have been locally; according to donor screening conducted in seroprevalence it was found to IgG e IgM anti *Toxoplasma gondii* in a Blood Bank city of Tijuana. This alert work on the presence of this parasite, so it is recommended to continue this kind of serological studies to adopt appropriate strategies and minimize risk of infection in people in this way.

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