

Serologic Monitoring of the Toxoplasmosis in Pregnant Women in Brazzaville, Congo

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ABSTRACT

Objectives: The objective of this work was to determine the immune status by researching antitoxoplasmic IgG and IgM.

Methods: this is a prospective study from November 4, 2013 to April 4, 2014 carried out at the Exau Kenn medical center laboratory located opposite the Makelekele Base Hospital (I Brazzaville district). A toxoplasmic serology was taken from all pregnant women (first trimester) admitted to the Laboratory as part of a medical follow-up of their pregnancies. Serodiagnosis was performed by the agglutination technique associated with the indirect solid phase immunoenzymatic technique (EIA).

Results: Of 139 pregnant women included in our study, 56.12% were immunized and 43.88% unimmunized. The seroprevalence was 69.04%. The percentage of women aged under 20 was 22.22%; and those between 20 and 39 years old was 46.77%; then 31.01% among those over 39 years of age. The risk factors incriminated in toxoplasmic infection for our study were: contact with soil, consumption of raw vegetables, level of hygiene and contact with cats.

Conclusion: toxoplasmosis in pregnant women in Brazzaville is a real problem that must be regularly revealed in order to put in place an action plan to identify and evade it.

Keywords

Serology, Toxoplasmosis, Women, Pregnant, Factors, Risk.

Background

The toxoplasmosis is a cosmopolite parasitose caused by a protozoan *Toxoplasma gondii*. It is usually benign, except in pregnant women because of the risk of fetal contamination and in the immunocompromised by its cerebral complications. Man can become contaminated from the cystic forms contained in the beef or sheep-red meat, intermediate hosts of the parasite. It can also be infected by ingestion of sporozoites from oocysts eliminated by the cat and found in vegetables or raw vegetables contaminated by

droppings. This risk of fecal-oral transmission is particularly high in countries with low hygiene standards [18].

Toxoplasmosis affects 1/3 of the world's population. It may, if contracted during pregnancy, lead to congenital infection [21]. In France, serological screening in pregnant women and in the absence of immunization, monthly serological surveillance up to childbirth has been put in place to limit the frequency and severity of congenital toxoplasmosis. Seroprevalence in pregnant women was evaluated in 1995 at 54% and the risk of maternal seroconversion at 1.5% [13,16].

Infection of the pregnant woman results in 10 to 30% of the fetus [8,11]. Brazzaville, capital of the Republic of Congo, is a space where there are more than 2/3 of the population; the circulation of waterborne infectious agents, such as enterovirus or enteropathogenic bacteria, is particularly high. This risk is potentially significant. Can data on the prevalence of toxoplasmosis or its consequences on fetal infection are available. This justifies the framework of the present study, which deals, among other things, with the theme: "serological monitoring of toxoplasmosis in pregnant women". The study was carried out on sera from pregnant women for whom serotyping of toxoplasmosis was prescribed during the first trimester of pregnancy without knowing their previous immune status and in the face of several clinical cases that may give rise to fear of early seroconversion in women Speakers.

In this work Immunological status is investigated by researching antitoxoplasmic G and M immunoglobulins in a number of pregnant women, through the study of the factors associated with toxoplasmic infection on the one hand and the identification of perinatal risk factors.

Materials and Methods

Type of study

We conducted a prospective study for a 4-month period from January 6 to April 11, 2014.

Framework of study

The study was carried out in Brazzaville at the Medical Analysis Laboratory of the Exau-Kenn Medical Center opposite the MAKELEKELE Base Hospital (I Makelekele district).

Study period

The study was carried out in Brazzaville over a period of 6 months, from 04 November 2013 to 4 April 2014.

Inclusion Criteria

We included in our study any serology of toxoplasmosis in the pregnant woman admitted to the Laboratory.

Exclusion Criteria

Our study excluded any other toxoplasmosis serology.

Study Variables

The variables chosen were age, level of study, contact with the soil, eating habits, knowledge of the mode of transmission, level of hygiene, retroviral serology.

Study technique and instruments

This prospective, analytical study focused on 139 pregnant women who were referred by their general practitioners and gynecologists to the Laboratory of the Exau-kenn medical center for serological follow-up during pregnancy. During the study period, each woman responded voluntarily to the questionnaire on age, consumption of uncooked meat, level of education, knowledge of toxoplasmosis, contact with the land (gardening, agricultural activities) And the

cat.he study was carried out in Brazzaville over a period of 6 months, from 04 November 2013 to 4 April 2014.

Serological analysis

Required equipment: 5 cc syringes, dry tubes, 5 to 50 µl precision pipette, yellow tips, scissors, laboratory stopwatch or watch.

Blood Collection: The blood sample is taken from the patients, preferably on an empty stomach, at the level of the superficial vein of the fold of the elbow. The amount of blood sampled was centrifuged at 5000 rpm for 10 minutes. The serological assay is performed with serum.

Statistical analysis

Statistical analysis of the results was carried out using the Epiinfo 2000 software. After adjusting the reports, a bi-varied analysis was used to compare the study variables with each other. The association between toxoplasmic serological status and the risk factors determining this infection was analyzed by using the Pearson Chi² test with p-value <0.05

Results

A total of seven risk factors for toxoplasmosis in pregnant women have been studied. The results showed that 73.14% of the women with toxoplasmic antibodies had permanent contact with the soil against 26.86 of the seronegative women with a statistically significant difference (p <0.01).

Most (72.37%) of these women used to eat raw vegetables. The level of education, knowledge of the mode of transmission of toxoplasmosis in these women and HIV seropositivity were not retained as risk factors for toxoplasmosis due to the insignificance of the statistical results for this study (p > 0.05).

In addition, the low level of hygiene in toxoplasmic women and their permanent contact with the cat were classified among the factors of acquisition of toxoplasmosis in them with a statistically significant difference (p <0.01) (Table 1).

The toxoplasmic seroprevalence in pregnant women was 69.04%. With a first place occupied by the age group of ≥ 41 years (85.71%), followed by 14-19 years, in third place comes the age group of 30-35 years (70.59%), the age group 26–29-year-olds occupy fourth place (68.42%), 20-25-year-olds come fifth (65.90%) and a last place occupied by the 36–40-year-old group (Table 2).

Out of a total of 136 HIV-positive pregnant women, 56.12% were immune to *Toxoplasma gondii* and 43.88% were actively infected with *Toxoplasma gondii* (Table 3).

Discussion

This study in which the sample comprise 139 persons, made in the laboratory of Medical centre of Exau-Kenn for a serology of the toxoplasmosis, has allowed a to know about the seroprevalence of 69,04% (Table 2).

Table 1: Risk factors for toxoplasmosis in pregnant women.

Facteurs of risk	Seropositives women (%) n=61	Seronegatives women (%) n=78	p value
<i>Contact with ground **</i>			
Présence	49 (73,14)	18 (26,86)	(p<0.01)
Absence	12(16,67)	60 (83,33)	
<i>Consumption of raw vegetables **</i>			
Présence	55 (72,37)	21 (27,63)	(p <0.01)
Absence	6 (9,3)	57 (90,47)	
<i>School level *</i>			
Primary	18 (62,07)	11 (37,93)	0.545
Secondary	22 (33,84)	43 (66,15)	
Illiterate	2 (66,67)	1 (33,33)	
Superior	19 (45,24)	23 (54,76)	
<i>Knowledge of the mode of transmission *</i>			
Présence	2 (50,0)	2(50,0)	0.90
Absence	59 (43,70)	76 (56,30)	
<i>Level of Hygiene **</i>			
Moyen	23 (24,47)	71 (75,53)	(p <0.01)
Bas	38 (84,44)	7 (15,56)	
<i>Contact avec le chat **</i>			
Présence	12 (92,31)	1 (7,69)	(p<0.01)
Absence	49 (38,89)	77 (61,11)	
<i>HIV *</i>			
Absence		1 (100)	0.50
Présence	61 (44,20)	77 (55,80)	

(**) = risk factors associated with toxoplasmic infection: p <0.01

(*) = Risk factors not associated with toxoplasmic infection

Table 2: Seroprevalence and distribution of IgG and IgM antibodies by age groups.

Antibodies	Age range in years						Total
	14-19	20-25	26-29	30-35	36-40	≥ 40	
IgM/IgG	% (n)						
	81.81 (9)	65.90 (29)	68.42 (39)	70.59 (36)	62.96 (17)	85.71 (6)	100 (136)

IgM: Immunoglobulin M

IgG: Immunoglobulin G

Age range	n	% Positive IgG (n)	% IgM positives (n)
14 - 19 years	9	81.81 (7)	18,18 (2)
20 - 25 ans	32	65.90(20)	34.09(14)*
26 - 29 ans	50	68,42 (29)	31,58 (18)
30 - 35 ans	33	70,59 (36)	29,41(15)
36 – 40 ans	10	62,96 (7)	37,04(3)
≥ 41 ans	5	85,71(4)	14,29(1)
Total	139	69.04 (61)	30.96 (6,1)

The average of age is about 29 years

(*): 3 cases of new infection in the range from 20 to 25 years.

Séroprévalence 69, 04%.

Table 3: Immunization of women according to age.

Age (years)	Number (n)	% immunized (n)	% Not immunized (n)
14 – 19	9	77,78 (7)	22,22 (2)
20 – 25	32	53,13 (17)	46,87 (15)
26 - 29	39	53,85 (21)	46,15 (18)
30 - 35	36	58,33 (21)	41,67 (15)
36 – 40	17	41,18 (7)	58,82 (10)
≥ 41	6	83,33 (5)	16,67 (1)
Total	139	56,12 (78)	43,88 (61)

56.12% of pregnant women are immunized.

43.88% of unimmunized pregnant women.

This result is different of that find in Morocco, especially in Nador, Tétouan and Kenitra, where the seroprevalences got were respectively 43,3%, 42,6% et 36,7%. That is near to which was got by Mékouar in 1972, in his study on the prevalence of the toxoplasmosis in Morocco, about 51% [19], and of 51,5% reported by Guessous-Idrissi et al [17], and that got in 2001 in the north of Tunisia (58,4%).

The high value of seroprevalence got in our study may be explain by climatic conditions, culinaires factors and socio-economic level. The climat of Brazzaville facilite. Le climat de Brazzaville facilite good Course of the life cycle of *Toxoplasma gondii* (rapid and complete sporulation).

The tropical climate affects the increase in the number of cases of toxoplasmosis. The same observation was made earlier by NEJMI and ALAMI in Morocco, following a comparison of toxoplasmosis prevalences in coastal cities and cities far from the sea [22]. The same observation was also made by El Mansouri in Morocco [13].

In addition, 73.14% of women with anti-toxoplasmic antibodies were found to have permanent contact with the soil (gardening, agricultural activities), statistically significant ($p < 0.01$), which could be the land a risk factor in the acquisition of toxoplasmosis. Birgisdottir et al. (2006) also found that contact with land was the main risk factor for *Toxoplasma gondii* [5].

The bi-varied analysis of risk factors revealed a statistically significant association between hygiene level, raw vegetable consumption and positive serology ($p < 0.01$). In Congo, the meat is consumed well cooked. The most probable mode of infestation would be the ingestion of parasitic elements of the soil reservoir (with the arrival of grills). The hot and humid equatorial climate favors the prolonged maintenance of their infectivity and floods.

In addition, possession of a cat is 92.31% in HIV-positive women and 7.69% in HIV-negative women (Table I). This association is statistically significant ($p < 0.01$). What is at odds with Laboudi et al in Morocco who have found that contact with the cat may not be an important risk factor [18].

Other factors, such as grade level, knowledge of modes of toxoplasmosis transmission, retroviral serology, may not be important risk factors. In our study, the difference in the percentages of the presence of these factors and those of their absence is not statistically significant.

Of the 139 pregnant women who participated in this study, 43.88% had positive toxoplasmosis serology. This rate is slightly lower than the 50.6% reported by El Mansouri et al in Morocco in 2007 [13] but rather close to that revealed by Ghania A. in Algeria (40%) [16].

The study of serologic variation in age showed that the percentage of positivity in women under 20 years of age was 22.22%, while

around 46.77% of women of ages between 20 and 39 years. However, for women over 40, the positivity rate is 16.67%. El Mansouri et al revealed a positivity rate of 32.4% for women under 20 years of age, 52% for women aged 20 to 39, and 63.8% for women over the age of 40 Years [13].

The analysis allowed us to detect 3 cases of infection in women aged between 20 and 25 years. These 3 cases were characterized by the presence of immunoglobulin M (IgM) and immunoglobulin G (IgG) titers < 10 IU / L. In women, the presence of IgM, the presence of high IgG titres, or the observation of seroconversion or an increase in titres is the most recent indication of infection. The only detection of IgM antibodies is not sufficient to confirm the evolutionary infection, on the one hand because most techniques can demonstrate the presence of specific IgM for several years [24], on the other hand, because evidence of IgM-free IgG may result from non-specific reactions [24]. However, the lack of the test of the index of avidity on the dating did not make it possible to ensure totally if the contamination is recent or previous.

Conclusion

At the end of our study through the results obtained on the 139 pregnant women, concerning the search for the avidity of immunoglobulin G (IgG) and antitoxoplasmic immunoglobulin M (IgM); It was noted that 56.12% of pregnant women are immunized and 43.88% of unimmunized pregnant women. From our study, it was found that the avidity of IgG and antitoxoplasmic IgM by the solid - phase solid - phase immunoenzymatic method (EIA) with the use of the latex technique is reliable and easy to apply.

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