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Title “Actuality of Seroprevalence of toxoplasmosis in women, dog and cat in Dakar in 2012”

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Abstract

Toxoplasmosis is an anthropozoonosis of medical and veterinary importance, due to the protozoan Toxoplasma gondii. Oocysts shed by felids play a key role in parasite transmission as they contaminate meat-producing animals, vegetables and water consumed later by humans.
In this work, we tried to reproduce the results of serological tests for toxoplasmosis performed in the laboratory of the Abass NDAO hospital's in women (179 cases) as a method using the enzyme immunoassay solid phase (EIA) and cats (50 cases) and dogs (20 cases) as a method using the agglutination test Live plate. He shows a seroprevalence of 25±18,98% in dogs, 70±12,70% in cats and 45.81±7,30% in women with 44.24±7,58% in pregnant women.
These first results need to be followed by more extensive investigations.

Keywords: Dakar, Prevalence, toxoplasmosis, Toxoplasma gondii.

Introduction

Toxoplasma gondii (T. gondii) is the agent of a cosmopolitan anthropozoonosis: toxoplasmosis. This intracellular parasite maintains an optional heterogeneous cycle between cats (definitive hosts) and other warm-blooded animals (intermediate hosts). The objective of the work presented here is part of the concern to assess the degree of infestation of domestic animals (cats) and women in determining the prevalence of toxoplasmosis in cats and dogs but also in especially the pregnant women in Dakar

Study Population

Our study population consisted of 50 cats and 20 dogs and 179 women came to a toxoplasma serology the laboratory of the Abass NDAO hospital to 50,20 and 179 respectively serology performed

Materials

The standard equipment of Immunocombs Orgenics SA has been used more patient sera for testing in women and animals (dogs and cats) that of Pastorex Toxo-latex BIO-RAD more sera of these animals.

Methods

It was used in the woman immunoassay solid phase Orgenics SA (Immunocombs) based on ELISA principle insoluble support shown by the combs and a developing tank with a pre-serum dilution for the determination of antibodies IgM in accordance with manufacturer's instructions. The positivity threshold of 10 IU / ml for IgG and CombScals (card color matching concentrations) to determine the title. The IgM follows the same principle but here the test is qualitative. (Annex 1). Among Pets (dogs and cats) the direct agglutination test plate was used and involves mixing a drop of serum with a drop of latex Pastorex Toxoplasma BIO-RAD whose positivity is materialized by visible agglutination with the naked eye after 2 minutes of rotary agitation. The positivity threshold to 6 IU / ml.

Results

It shows respectively in women, the cat and the dog an overall seroprevalence of 45.81 ± 7.30% (82 positive / 179 tested) and averaged 30.18 ± 17.49% with significant peaks in June and July for the women (25 and 20 respectively) (Table 5), 70 ± 12.70% (35 out of 50 tested positive) and 58.8 ± 29.62% with significant peaks in January and April (10 and 9 respectively) and 25 ± 18.98% (5 of 20 tested positive) and 22.21 ± 33.18% (Table 6).

Discussion

At the Stray cat, an overall prevalence of 70 ± 12.7% was found in our study. This rate is higher than those found in Senegal in 2012 by Adjé Koffi at Kaolack (58 ± 9.7% and 59.8 ± 9.6%: apparent and real) which corresponds to the average; Allanonto in St. Louis (68%), Andree Prisca Ndjoug NDOUR Dakar (55.37 ± 9%) and Coulibaly in Dakar (55.3 ± 9% and 57 ± 8.8%: apparent and real). This difference could be explained by the technique used and the sample size.

In dogs an overall prevalence of 25 ± 18.98% was found in our study with the average of 22.21 ± 33.18%. There are few data indicating a very low prevalence in dogs. However Adjé Koffi Kaolack in 2012 has founded a prevalence of 58 ± 9.7% and 59.8% ± 9.6% (apparent and real) higher than ours. Coulibaly also in Dakar in 2012 had described a prevalence of 43.9 ± 8% and 45 ± 8.2 %(apparent and real). Allanonto in Saint Louis was found in 2012: 48% .these differences could be explained by the similarity between the oocysts of Neospora caninum and Toxoplasma gondii and the size of my sample. Climatic conditions such as heat and humidity, the sample size and the proximity of dogs and cats here could explain the high rate found in this study.

In women, we found an overall prevalence of 45.81 ± 7.30% similar at Coulibaly's prevalence in 2012 in Dakar (50% women), Andree Prisca Ndjoug NDOUR in 2012 in Dakar (43.8 %) and those that have been observed in Dakar by Ndiaye who has founded a seroprevalence of 44.4% in 2010 in a prospective study from January 2010 to October 2012 over a period of 10 months about 209 people using EIA method. Also, Faye, in 1998, of 353 women of childbearing age which 205 were pregnant and 148 non-pregnant to an epidemiological survey revealed a seroprevalence of 40.2% with a confidence interval between 30.6% and 49.8%, the method used is ELISA and the threshold of positivity 10UI/ml. These results are higher than those found by Diallo in 1993 who has founded a prevalence of 30% in a retrospective study of 20 years about 720 peoples using the method of Sabin and Feldman. This difference could explain the technique used by the author and not the size of the study population. However, it is similar to the average 30, 18 ± 17.49%. The same study conducted in 1995 by Gentilini and those with the most recent result showed a seroprevalence of 18% in Black Africa particularly in Senegal. In this study there is a 27.81% increase in the space of 18 years could be explained by the systematic serology in the majority of pregnant women but also by rampant promiscuity, ignorance of the disease and the role of the cat in transmission due to its high levels of contamination. More recently, Senegal, several studies have been made in 2012 and Adjé Koffi found a prevalence of 24.2% among 170 pregnant women attending antenatal clinics in Kaolack lower in our study. Allanonto observed in 2012 a prevalence of 32.9% among 86 women in Saint Louis same to the average prevalence but lower than the overall prevalence found in this study. This difference could be explained by the technique used and the sample size. However, this study would place our country in front of the stage with a prevalence that continues to rise to a crescendo, with more than 9.81% in 8 years ago compared to the 2004 study. This could be explained by ingestion of oocysts from land-based tank cohabitation with stray cats, 70% are infected and not by our knowledge of the disease populations, the role played by the latter in its transmission and lack of support from the state as part of its health policy to eradicate this infection. As these high prevalence rates found in the cat and dog justify the exposure of women whose seroprevalence believes every year.

Conclusion

In view of the high domestic animals human companions prevalence, we should not be surprised that we prevalence is higher in pregnant women with 44.24 ± 7.58% (73 Positives / 165 tested). However, it is alarming and since no vaccine is currently available, it is important and urgent that health authorities can educate, inform and educate the public by compliance with dietary measures to avoid 'swallowing oocysts and the establishment of a national program to fight against toxoplasmosis seen to reduce the prevalence of the outbreak and thus ward off complications especially in pregnant women and immunocompromised patients.

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Tables and Annex

2012→**Women**			
	Sera tested	Positive	Prévalence ± confidence interval (CI) (%)
January	28	14	50 ±18,52
February	8	3	37,5 ±33,55
March	20	5	25 ±18,98
April	26	12	46,15 ±19,16
May	2	0	0 ± 0
Jun	33	25	75,76 ±14,62
July	42	20	47,62 ±15,10
August	8	2	25 ±30,01
September	4	1	25 ±42,43
October	5	0	0 ± 0
November	3	0	0 ± 0
Total	**179**	**82**	**45,81 ±7,30**
Average Prevalence			30,18 ±17,49

Table5: Monthly variation of toxoplasmosis at CHAN 2012, January, 01 to November, 30

2012→ **CAT**			
Month	Sera tested	Positive	Prévalence ± CI (%)
January	10	10	100 ± 0
February	8	3	37,5 ±33,55
March	5	2	40 ±42,94
April	12	9	75 ±24,50
May	0	0	0
Jun	2	1	50 ±69,30
July	3	2	66,67 ±53,34
August	5	3	60 ±42,94
September	5	5	100 ±0
Total	**50**	**35**	**70±12,70**
Average Prevalence		58,8 ± 29,62	

2012→**DOG**			
Month	Sera tested	Positive	Prévalence ± CI (%)
January	3	1	33 ,33 ± 53,34
February	2	0	0
March	3	1	33,33 ±53,34
April	3	0	0
May	2	1	50 ±69,30
Jun	2	1	50 ±69,30
July	3	1	33,33 ±53,34
August	1	0	0
September	1	0	0
Total	**20**	**5**	**25 ±18,98**
Average Prevalence			22,21 ± 33,18

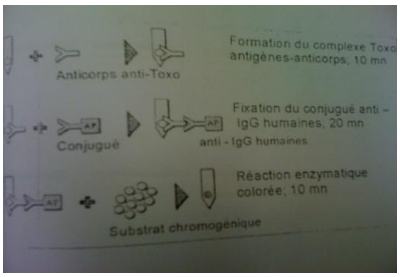
Table 6: Average and overall prevalences in the cat and the dog

Annex 1

Immunocombs Method

Principe

The test procedure involves transferring the comb from one compartment to the next compartment. The first step is to distribute the samples in individual wells of the tray compartments Development (For IgM, the samples are first pretreated to capture IgG and an incubation step with the diluent compartment A to absorb rheumatoid factor). Then Immunocombs card is inserted into the wells A for Antigen-antibody reaction. Any unbound antibody specifically during this first step is removed in a washing step in compartment B. In compartment C, the Toxoplasma IgM or IgG as the case attached to the lower spots of the comb teeth and human immunoglobulins top spot (internal control) are recognized by anti-IgM or anti-human IgG conjugated to alkaline phosphatase (AP). After two further washing steps in compartments D and E, alkaline phosphatase reacts in compartment F with a chromogenic compound. The latter reaction leads to the visualization of results as gray-blue spots at the surface of the comb teeth. The kit includes a positive control (IgM or IgG anti-Toxoplasma antibodies as appropriate) and a negative control. The test performed, the tooth of the positive control must show two spots. The tooth of the negative control should show the upper spot of internal control, either alone or optionally in combination with a very low bottom spot. Finally the top spot of internal control must be visible on each tooth corresponds to a test sample, thus confirming the proper functioning of reagents as well as proper handling.



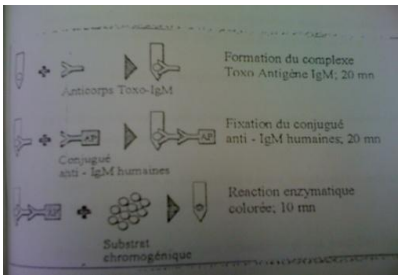


Figure 10: Principle of the IgG response Figure 11: Principle of the IgM response

Operative mode

The procedure summarized below is available to users of the package Immunocomb Toxo IgM or IgG.

1 Balancing samples and reagents to be tested at room temperature and perform the test at room temperature.

2 Pre-dilute 10 ml of each sample and control in 100 mu.l of sample diluent and incubate for 10 minutes (IgM only).

3-Add 25 ml of each pre-diluted sample for IgM or 10 ml of each sample for pure IgG and two controls specific amount as the case in the well compartment A and

homogenize (incubate for 10 minutes for IgM).
4 Insert the comb-in compartment A and proceed as indicated in Table 16

Step	compartment	operation
Antigen-antibody reaction	A	Homogenize, incubate 20 minutes to IgM (10 minutes for IgG), absorb
wash	B	Shake and incubate for 2 minutes absorb
conjugated	C	Homogenize, incubate 20 minutes, absorb
wash	D	Shake and incubate for 2 minutes absorb
wash	E	Shake and incubate for 2 minutes absorb
revelation	F	Homogenize, incubate for 10 minutes
Stop reaction	E	Incubate for 1 minute, air dry

Table 16: Summary of procedure




a) Pretreatment b) Incubation trays c) A Step d) Step B




e) Step C f) StepD g) Step E h) Step F

Figure 12: Illustration of procedure

Reading and interpreting

Reading: Reading is done visually, for qualitative and quantitative IgM to IgG.It

consists in comparing the intensity of each spot of the lower tooth with the intensity of the spot of the lower tooth of the positive control. As follows:

-A spot having an intensity greater than or equal to the intensity of the positive control spot indicates the presence of toxoplasmosis IgM or IgG antibodies in the sample tested.

-It no spot or a spot having an intensity lower than the intensity of the positive control spot indicates the absence of detectable levels of IgG or IgM antibodies in the test sample antitoxoplasmic (negative) (Figure 13).

Picture:

Figure 13: Embodiment of spots on the teeth of the combs

The quantification is done using the CombScals TM calibrating the lower spot of the positive control in the corresponding color in the color scale by adjusting the rule so that the '10 'or' C + 'appears in the window at above the intensity of the selected color and finally reads the results of different samples without moving the calibrated rule (Figure 14) position.

Picture

Figure 14: Calibration of the rule in light of the CombScals quantification

Interpretation

That the presence of IgM antibodies do not persist beyond one year or observable reactivation, the qualitative detection of IgM antibodies provides a quick acute or recent infection only confirmation. The quantitative detection of IgG antibodies can provide a determination of immune status in pregnant women and newborns, because of the persistence of anti-Toxoplasma IgG throughout life. In case of an increase of the title beyond four times the previous level, we can diagnose an active infection. In children, the detection range of anti-Toxoplasma IgG infection can discriminate between its congenital origin (constant) or neonatal (gradual increase in the title). (Desmonts 1982, Frenkel, 1973; Luf, 1983, Vercruysse, 1982).

Annex 8

Methods of statistical analysis results

the calculations of prevalence and confidence intervals were made in using Microsoft Excel using the following formulas:

$$P = n/N * 100$$

n = number of positive samples

N = total number of samples examined

P = Prevalence

The confidence interval (CI) 5p.100 at risk:

:

$$CI = P \pm 1,96 \sqrt{P(1-P)/N}$$

P = prevalence observed in the sample

N = total number of samples examined

the tests were performed with a confidence interval of 95%

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