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Artigo

Seroprevalence of feline toxoplasmosis in Teresina, Piauí, Brazil

Soroprevalência da toxoplasmose felina em Teresina, Piauí, Brasil

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Resumo: O *Toxoplasma gondii* é o protozoário causador da Toxoplasmose, zoonose que tem os felídeos como hospedeiros definitivos e afeta um terço da população mundial. No Brasil, cerca de 40% a 80% da população já teve contato com o parasito, porém a doença se manifesta em poucos. Gestantes com a doença aguda podem transmitir ao feto via placenta, causando transtornos nervosos e até o óbito. Em Teresina, capital do Estado do Piauí, casos humanos são relatados, porém não há relatos sobre a doença na população felina. Devido à importância dos felídeos domésticos na transmissão da doença, propomos estudar a soroprevalência da toxoplasmose em gatos no município de Teresina. Para tanto, foram analisadas 109 amostras de sangue de gatos destinados à eutanásia no Centro de Controle de Zoonoses do município, coletadas entre os meses de janeiro a abril de 2015. As amostras foram testadas por um ensaio imunoenzimático indireto em fase sólida por meio do kit comercial ImmunoComb® II Toxo IgG para a determinação de anticorpos tardios anti-*T. gondii*. Todos os animais testados foram soronegativos, sugerindo que os mesmos provavelmente tiveram bom manejo alimentar e não se expuseram aos fatores de risco para a infecção. Entretanto, outros fatores podem ter interferido nos resultados, como o pequeno número de animais pesquisados, a faixa etária jovem e a procedência de bairros próximos ao Centro de Zoonoses, facilitando o acesso ao serviço de saúde pública veterinária.

Palavras-chave:*Toxoplasma gondii*, ELISA, oocistos.

Abstract: *Toxoplasma gondii* is the causative protozoan Toxoplasmosis, zoonosis that has felids as definitive hosts and affects one third of the world population. In Brazil, about 40% to 80% of the population has had contact with the parasite, but the disease manifests itself in a few. Pregnant women with acute disease can transmit via placenta, causing nerve disorders and even death. In Teresina, Piauí state capital, human cases are reported, but there are no reports of the disease in the cat population. Due to the importance of domestic felines in disease transmission, we propose to study the seroprevalence of toxoplasmosis in cats in the city of Teresina. Therefore, we analyzed 109 blood samples from cats destined for euthanasia in the Zoonosis Control Center of the municipality, collected between January and April 2015. The samples were tested by an indirect enzyme immunoassay solid phase through the kit commercial ImmunoComb® II ToxoIgG for the determination of anti-T. Gondii antibodies later. All animals tested were soro-negative, suggesting that they probably had good food handling and are not exposed to risk factors for infection. However, other factors may have affected the results, such as the small number of animals studied, the young age and the origin of neighborhoods near the Zoonosis Centre, facilitating access to veterinary public health service.

Keywords:*Toxoplasma gondii*, ELISA, oocytes.

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Introduction

Toxoplasmosis is a cosmopolitan intracellular protozoan, whose causative agent is *Toxoplasma gondii* (FIALHO et al., 2009). The felines are considered the definitive hosts, because it is the sexual reproduction of the parasite, while mammals, including humans, and birds are considered intermediate hosts. In these, the infection can be acquired by ingestion of water or food containing the infectious forms eliminated in the feces of felids, called oocytes. The infection may also spread via the placenta or by blood transfusion (LOPES; BERTO, 2012). In cases of congenital transmission in humans, toxoplasmosis can cause blindness or mental retardation, and can even cause death in immune compromised individuals. The transplacental transmission can occur in infected pregnant women who are in the acute phase of the disease or activation of the same during pregnancy associated with severe immunosuppression. This type of infection is approximately 14% in the first quarter and 59% in the last trimester of pregnancy (RODRIGUES et al., 2015). The definitive hosts have the habit of hunting small mammals and birds, and they may be infected tissue cysts of *T. gondii*. The high spread of toxoplasmosis is associated with the fact that

the Felidae can eliminate about 360 million oocysts in feces in a single day, and they are extremely resistant to environmental influences and can sporulate and survive even in seawater for several years (PINTO et al., 2009a). The infection can be diagnosed by indirect methods, detecting IgG and IgM antibodies by immune enzymatic ELISA assay (Enzyme Linked Immuno sorbent Assay), as well as direct methods, using the DNA isolation of parasite by polymerase chain reaction method (PCR - Polymerase Chain Reaction) (PINTO et al., 2009b). It is estimated that, worldwide, one third of the human population has antibodies to *T. gondii*, and that amount increases with the age of each individual, the greater opportunity to acquire the infection (HILL; DUBEY, 2002). However, in tropical or sub-tropical humid climate, the prevalence is higher due to the weather favoring the survival of oocytes in the environment (BACCARIN; DE OLIVEIRA, 2007). The incidence of toxoplasmosis in human ranges from 15% to 85% in several countries (FOSCHIERA, 2009). In Brazil, the prevalence in the population varies between 40% and 80% (FRANCISCO et al., 2006). In different Brazilian states, numerous outbreaks of human toxoplasmosis had high epidemiological relevance through the contamination meat, other food and water by feces of cats (DO CARMO et al., 2010). We do not know the actual prevalence and incidence of toxoplasmosis in the state of Piaui, due to lack of studies and lack of prevention campaigns of the disease. However, a study done in the capital, Teresina, revealed that between 2010 and 2014, 2.719 serology for toxoplasmosis were conducted among residents of the Central Laboratory - LACEN, 95% of women, with a prevalence of 69%. In males, the prevalence was 67%. The prevalence of IgG in the municipality was 89.4%, while IgM was 4.3%, setting risk of transplacental transmission (CARVALHO et al, 2015). As the essential cats to the spread and perpetuation of the parasite in nature, this study aimed to study the seroprevalence of *T. gondii* in cats collected Zoonosis Control Center of the municipality for euthanasia, in order to meet the current epidemiological situation of animals in Teresina, Piaui's capital, where there is to date records of research proving the serologic status for *Toxoplasma gondii* in cat population, making this pioneering study, and contributing to the understanding of disease transmission.

Methodology

Blood samples were collected (2-3 mL) by venipuncture jugular cats collected for euthanasia by the Zoonosis Control Center of Teresina (CCZ) in the period January-March 2015, regardless of the presentation of clinical signs of toxoplasmosis. Sedation, anesthesia and harvesting of the material was made by veterinarians of the CCZ, moments

before the euthanasia of animals, following the rules established by Resolution No. 1.000 / 2012, the Federal Veterinary Medical Council (CRMV). After collection, the samples were centrifuged at 3,000 RPM for ten minutes, transferred to sterile vacuum tubes without anticoagulant and stored at -20 ° C until the exams in the Integrated Health Centre (CIS) of the University Center UNINOVAFAPI. University Center approved this study with the protocol nº 0017/14.

Results and Discussion

Were used in this study 102 cats without breed and of both sexes, different ages and from different parts of the city (Table 1). Source: Zoonosis Control Center of Teresina. All samples analyzed were negative for the presence of antibodies specific for Toxoplasma. Meneses et al (2009) in Belem found similar results, analyzing 32 animals by enzyme immunoassay. The same result was also found by Salata et al (1985) using 09 serum samples from cats in Botucatu, State of São Paulo. The first author credits the results to good food handling cats, minimizing contact with the sources of infection.

Contrasting with this study, Qian et al (2012) analyzed 64 samples of feline serum and found a prevalence of 57.8% in wild animals in Beijing, China. Langoni et al (2001) studied toxoplasmosis in cats in the states of São Paulo and Paraná by indirect immunofluorescence (IIF), finding 37 samples (19.4%) reagents. Other studies have analyzed (ARAGÃO et al., 2003; BRAGA et al., 2012; BRESCIANI et al., 2008; MIRÓ et al., 2004; NETTO et al., 2003; PINTO et al., 2009) found an average prevalence of 30%, and most animals surveyed were female (68.6%). Only two of these studies examined the seroprevalence by sex. One of them (Pinto et al., 2009), held in Porto Alegre, RS, surveyed 115 males and 130 females cats, finding 25.2% and 28.4% of seropositive animals by the method of indirect hem agglutination (HI) respectively. Using the technique of IFAT for the same animals, found a prevalence of 35.6% for males and 40% for females. In another study (Garcia et al., 1999), 163 cats were analyzed farms of a city in the countryside of Parana, finding 73% of seroprevalence, and 47.9% males and 52.1% females, finding no significant difference between the sexes. There have been no studies that took into account the age of the animals, the fact that 54.8% of the cats of this study have age or less than one year may have influenced the outcome of seroprevalence, since animals over time life have more chance of exposure to risk factors.

Another factor that may have influenced the result was the fact that 76.3% of the animals were coming from neighborhoods near the Zoonosis Control Center, in the north of the city. This leads to easier for owners who actively seek the services of the agency.

Despite the seroprevalence was 100% negative, a negative serological reaction does not exclude the parasite Toxoplasma gondii, since no methods 100% sensitivity and specificity (SALATA et al., 1985). Considering the existence of autochthonous human cases of toxoplasmosis in Teresina, we recommend further studies with a larger number of animals as well as other areas of the city, using various diagnostic methods in an attempt to elucidate the possible sources of infection of T. gondii.

Table 1. Sex, age and origin of cats collected for euthanasia by the Zoonosis Control Center of Teresina, in the period January-April 2015.

Characteristics	**N**	**%**
Sex		
Male	70	68,6
Female	32	31,3
Age		
5monthsandless	46	45
6months - 1 year	10	9,8
2years - 5 years	44	43,1
6yearsand more	2	1,9
Origin (neighborhood)		
Acarape	7	6,8
Centro	10	9,8
Ilhotas	14	13,7
Matadouro	13	12,7
Matinha	19	18,6
São Joaquim	39	38,2

Conclusions

This is the first study on the prevalence of toxoplasmosis in cats in Teresina, and the fact that the seroprevalence was negative in the sample used, attribute this result to a number of factors such as the number of studied animals, the young age group, management food and regions of origin of the cats.

However, despite these results, this study provides important data on the frequency of antibodies to Toxoplasma gondii in cats in the city of Teresina, assisting in the understanding of the epidemiology of the disease and guiding future studies on the subject, since it has been reported seroprevalence in humans.

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