

Occurrence of antibodies against *Leptospira* spp in dogs from Teresina, Piauí, Brazil

Ocorrência de anticorpos contra *Leptospira* spp em cães de Teresina, Piauí, Brasil

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Abstract

Leptospirosis is a systemic disease caused by the species of bacteria *Leptospira* spp., which affects human beings, domestic and wild animals. The present study searched the presence of antibodies against *Leptospira* spp. in the canine population of the city Teresina, Piauí, and the most common serovars. Blood samples from 425 stray dogs were collected in the local zoonosis center in Teresina from July 2010 to January 2012 and submitted to the Microscopic Seroagglutination Test (MAT). This study found an average infection rate of 17.41% (IC 95%; 13,8 – 21,0) by 11 different serovars; the four most frequent were Canicola (18.9%), Autumnalis (16.2%), Icterohaemorrhagiae (12.1%), and Butembo (12.1%). The questions raised in this study indicated the occurrence of *Leptospira* spp infection in dogs of Teresina- Piauí, Brazil.

Keywords: Leptospiras. Dogs. Epidemiology.

Resumo

A leptospirose é uma doença sistêmica causada por bactéria *Leptospira* spp. que afeta seres humanos, animais domésticos e selvagens. O presente trabalho investigou a presença de anticorpos anti-*Leptospira* spp. na população canina da cidade de Teresina-Piauí, e os respectivos sorovares predominantes. Amostras de sangue de 425 cães foram coletadas no Centro de Controle de Zoonoses de Teresina, no período de julho de 2010 a janeiro de 2012, e submetidas à prova de Soroaglutinação Microscópica (SAM). Este estudo encontrou uma taxa de infecção média com 17,41% (IC 95%; 13,8 – 21,0) e 11 sorovares reagentes, sendo os prevalentes Canicola (18,9%), Autumnalis (16,2%), Icterohaemorrhagiae (12,1%) e Butembo (12,1%). As questões levantadas neste estudo indicam a ocorrência de infecção por *Leptospira* spp em cães da cidade de Teresina-Piauí, Brasil.

Palavras-chave: Leptospiras. Cães. Epidemiologia.

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Leptospirosis is a disease caused by pathogenic species of *Leptospira* that affect humans, domestic, and wild animals, and is the most widespread zoonosis in the world (ADLER; DE LA PEÑA MOCTEZUMA, 2010).

Epidemiologically, dogs play an important role in the disease cycle because they act as sentinels, may alert the introduction of a new serotype of zoonotic importance, and also act as indicators of environmental contamination (BLAZIUS et al., 2005).

Many serological studies performed in dogs in Brazil have shown the variability of the distribution of predominant *Leptospira* serovars in different locations. The most frequent are Autumnalis, Icterohaemorrhagiae, Copenhageni, Canicola, Pyrogenes, and Castellonis (BATISTA et al., 2005; FONZAR; LANGONI, 2012; MORIKAWA et al, 2015;). In the state of Piauí, north of Brazil, there are many reliable studies of leptospirosis in

bovines (MINEIRO et al., 2010), swines (GONÇALVES et al., 2011), and ovines (CARVALHO et al., 2011). However, the few researches conducted in dogs are controversial and ambiguous (FAVERO et al., 2002). The present study clarifies the occurrence of leptospirosis in the canine population of Teresina (PI) and points out the predominant serovars in this region.

Blood samples were collected from 425 dogs at the Zoonosis Management of Teresina (GEZOON). The blood collections were performed from July 2010 to January 2012.

The samples were collected via venipuncture of the jugular and centrifuged at 2500 RPM for 10 min in order to obtain the serum, which was maintained at -20°C. The

serum was sent to the Laboratory of Bacterial Diseases of the Biological Institute of São Paulo, submitted to the Microscopic Seroagglutination Test (MAT), and tested for the serovars Icterohaemorrhagiae, Canicola, Pomona, Grippotyphosa, Wolffi, Hardjo, Australis, Autumnalis, Bataviae, Bratislava, Butembo, Castellonis, Copenhageni, Cynopteri, Hebdomadis, Javanica, Panama, Pyrogenes, Shermani, Tarassovi, Whitcombi, and Sentot. The criterion adopted to consider the serum reactive was the presence of 50% of agglutinated leptospires by microscopic field in a 100-fold dilution. The positive samples for the initial titer were diluted again successively in a ratio of two and tested for the previous serovars. The final titer was the reciprocal of the highest dilution presenting 50% agglutination.

Table 1 – Serological survey of leptospirosis in dogs attended by the urban zoonosis service of Teresina, Piauí, Brazil. Results of Microscopic Agglutination test (MAT) according to the reactive serovar and titers. Blood collections performed from 2010 to 2012

Serovar	Antibodies Titer (UI)							Total(%)
	100	200	400	800	1600	3200	6400	
Australis	2	2	2	1	-	-	-	7 (9,5)
Autumnalis	5	1	3	2	-	1	-	12 (16,2)
Butembo	2	5	2	-	-	-	-	9 (12,1)
Canicola	2	3	2	4	2	-	1	14 (18,9)
Castellonis	4	3	-	-	-	-	-	7 (9,5)
Copenhageni	2	1	-	1	-	-	-	4 (5,4)
Grippotyphosa	-	2	2	-	-	-	-	4 (5,4)
Icterohaemorrhagiae	6	1	2	-	-	-	-	9 (12,1)
Pomona	1	1	-	-	-	-	-	2 (2,7)
Pyrogenes	-	-	3	-	-	2	-	5(6,8)
Shermani	1	-	-	-	-	-	-	1 (1,4)
Total	11	14	7	2	-	-	-	74 (100)

The occurrence of dogs tested positive for at least one the 22 *Leptospira* serovars included in MAT was 17.41% (95% CI 13.8 to 21.0) for 11 different serovars, and the four most frequent were Canicola (18.9%), Autumnalis (16.2%), Icterohaemorrhagiae, and Butembo (12,1%). In Brazil the occurrence of dogs presenting antibodies against of *Leptospira* spp. varies widely, ranging from 7.1% to 73.3%, and the most frequent serovars observed in the present study are consistent with those found in other investigations (FONZAR; LANGONI, 2012; LAVINSKY et al., 2012; MARTINS; LILENBAUM, 2013; MORIKAWA et al., 2015). Although reactions to serovar Butembo have not frequently been found in

dogs in recent years, they were found in bovines of some regions of Brazil, mainly in the State of Santa Catarina, and the occurrence of cross infection between dogs and cattle may be possible (TONIN et al., 2010). The chance of infection of the dogs by others serovars is related to the contact of these animals with others reservoirs such as wild animals and livestock, due to the increased urbanization (STOKES et al., 2007). Nevertheless, cross-reaction of antibodies occurs commonly among serovars included in the same serogroup (LEVETT, 2001), which can justify the high prevalence of reactions to serovars Butembo, and Autumnalis, both of them included in the same serogroup Autumnalis.

In the case of antibodies titers induced by vaccination, however, it was observed that some of the samples in this study presented positive reactions to the serovars Butembo, Australis, Autumnalis, Castellonis, and Shermani, which are not included in the vaccines anti-leptospirosis produced for dog immunization in Brazil. Moreover, the vaccination of dogs against *Leptospira* spp., has a proven effectiveness of 14 months (MINKE et al., 2009), and only a few owners have the habit of annually vaccinating their dogs – or

even of vaccinating once, since a large part of them come from low income neighborhoods, and lack information regarding the prevention of public and animal diseases. The most part of owners only vaccinate against rabies, provided during the Annual Vaccination Campaign.

Thus, given the issues raised in this study, it is probable that infection of *Leptospira* spp. in dogs is present and that these animals can be reservoirs of different serovars of the bacteria in this region.

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