Research Note

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Detection of anti-*Toxoplasma gondii* antibodies in carthorses in the metropolitan region of Curitiba, Paraná, Brazil

Detecção de anticorpos anti-*Toxoplasma gondii* em cavalos carroceiros da região metropolitana de Curitiba, Paraná, Brasil

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Abstract

Toxoplasma gondii, the agent for toxoplasmosis, has worldwide distribution. Horses normally play a secondary role in its life cycle, but movement around urban areas, feeding on grass and the increasing use of carthorses for gathering recyclable material in some urban areas of Brazil may increase their exposure to *T. gondii* infection. The aim of the present study was to investigate the frequency of anti-*T. gondii* antibodies in carthorses in the metropolitan region of Curitiba, PR. IgG antibodies against *T. gondii* were detected using the indirect fluorescence antibody test (IFAT) (titers ≥ 64). Seventeen (17.0%) of the 100 horses sampled were seropositive. There were no statistical differences in relation to sex (p = 0.28) or age (p = 0.15). Our findings suggest that carthorses are exposed to *T. gondii* infections and that no associations with age or sex exist.

Keywords: *Toxoplasma gondii*, carthorses, indirect fluorescence antibody test.

Resumo

Toxoplasma gondii, agente da toxoplasmose, tem distribuição mundial. Geralmente cavalos desempenham papel secundário no ciclo de vida do *T. gondii*. Entretanto, a circulação em meio urbano, a alimentação com gramíneas e o aumento no uso de cavalos carroceiros para recolhimento de material reciclável em algumas áreas urbanas do Brasil podem aumentar a exposição desses cavalos ao *T. gondii*. O objetivo deste estudo foi investigar a frequência de anticorpos anti-*T. gondii* em cavalos carroceiros da região metropolitana de Curitiba, PR. Os anticorpos da classe IgG contra *T. gondii* foram detectados pela reação de imunofluorescência indireta (RIFI) (títulos ≥ 64). Dezessete (17%) dos 100 cavalos avaliados foram positivos e não houve diferença entre sexos (p = 0,28) ou idade (p = 0,15). Esses achados sugerem que cavalos carroceiros estão expostos a infecções por *T. gondii*, não existindo associação com a idade ou o sexo dos animais.

Palavras-chave: *Toxoplasma gondii*, cavalos carroceiros, imunofluorescência indireta.

Toxoplasmosis is a worldwide infectious disease caused by *Toxoplasma gondii*, which is an intracellular obligate protozoon capable of infecting any warm-blooded animal, including human beings (DUBEY et al., 2004). Domestic and wild cats are the definitive hosts and can eliminate oocysts in their feces (ARAMINI et al., 1999; LINDSAY et al., 2005).

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Toxoplasmosis has been identified in horses since the early 1970s (WEILLAND; DALCHOW, 1970). These animals normally play a secondary role in *T. gondii* infection (GARCIA et al., 1999). However, the carthorse population has been continuously increasing in some urban and peripheral urban areas in Brazil, mostly due to transportation of recyclable material (LARA et al., 2006). During their daily journeys within the city limits, horses are fed on urban grassy areas in public parks, where cat feces are found more intensely. The objective of this study was to evaluate the frequency of anti-*T. gondii* antibodies in carthorses in the metropolitan area of Curitiba.

Table 1. Age and sex of carthorses examined and the numbers and percentages of animals positive for the presence of anti-*T. gondii* antibodies, in the metropolitan area of Curitiba, PR.

	Total	Positive	%
Age (p = 0.15)			
<6 years	29	9	31.03
6-9 years	26	4	15.38
>9 years	31	3	9.67
Unknown	14	1	7.14
Sex (p = 0.28)			
male	53	7	41.18
female	47	10	58.82

% - percentage.

A total of 100 carthorses were examined. All of them were crossbred horses, 53 were males and 47 were females. Their ages ranged from 6 months to 22 years .These horses were mostly used for pulling carts containing recyclable material. All of these animals had been spontaneously taken to the Zoonosis Control Center by their owners because of a veterinary program sponsored through a partnership between the city's Animal Services Agency and the Federal University of Paraná. The present study was approved by the Animal Ethics Committee of the Federal University of Paraná(protocol number 027/10).

Blood samples were collected by means of venous puncture using a vacuum tube system. The serum was separated and stored at –20 °C until processing at the Biological Institute, São Paulo, Brazil. The samples were screened for anti-*T. gondii* antibodies using an indirect fluorescence antibody test (IFAT) for IgG with a previously-established cutoff titer ≥64 (SULZER; HALL, 1967). Associations among occurrence of anti-*T. gondii* antibodies and sex and age were analyzed by means of the chi-square and Fisher statistical tests, with $p < 0.05$.

Antibodies against *T. gondii* were found in 17 (17.0%) of the 100 horses examined, all with a serum titer of 64. Among the positive horses, 58.82% (10) were females and 41.18% (7) were males. There were no associations with sex (p = 0.28) or with age (p = 0.15). The data are presented in Table 1.

The results were similar to those previously found using IFAT among recreational horses in the state of Paraná (GARCIA et al., 1999), in which a total of 21/173 horses (12.1%) were seropositive. Similar seroprevalence of anti-*T. gondii* antibodies have been observed in clinically healthy horses in Brazil (15.8%), Argentina (13.1%) (DUBEY et al., 1999a, b) and Tunisia (17.7%) (BOUGHATTAS et al., 2011).

However, higher occurrence of anti-*T. gondii* antibodies were observed in horses at slaughterhouses in Paraná (VIDOTTO et al., 1997) and São Paulo (VILLALOBOS et al., 2005) with, respectively, 31.55% and 47% positivity. Lower seroprevalence was observed in central Brazil, with only 2/150 (1.3%) positive horses on beef cattle farms (SILVA, 2005) and in Rio de Janeiro with 19/430 (4.42%) positive horses (GAZÊTA et al., 1997).

Different techniques, cutoff values, geographical locations and management conditions may explain some of the seroprevalence differences among different studies.

In summary, our findings suggest that carthorses in this study region are exposed to *T. gondii* infections, and that age and sex are not associated with the presence of antibodies.

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