



Tehran University of
Medical Sciences
Publication
<http://tums.ac.ir>

Iranian J Parasitol

Open access Journal at

<http://ijpa.tums.ac.ir>



Iranian Society of
Parasitology
<http://isp.tums.ac.ir>

Short Communication

Seroprevalence of *Neospora caninum* Infection in Camels (*Camelus dromedarius*) in Isfahan Province, Center of Iran

* M Hosseinijad, K Pirali-Kheirabadi, F Hosseini

Research Institute for Zoonotic Diseases; Faculty of Veterinary Medicine, University of Shahrekord, Shahrekord, Iran

(Received 22 Apr 2009; accepted 10 Oct 2009)

Abstract

Background: The aim of this study was to investigate the sero-prevalence of *Neospora caninum* infection in *Camelus dromedarius*; the most popular camel species in Iran.

Methods: Totally, 310 serum samples were collected from camels in Isfahan Province during 2008 and tested in Shahrekord University using indirect fluorescent antibody test (IFAT) for serodiagnosis of anti-*N. caninum* IgG antibodies as a cross-sectional study.

Results: Among evaluated serum samples, 10 (3.22%) had anti-*N. caninum* antibodies detectable in dilutions of 1:50 and 1:100. to rule out false positive results due to cross-reactivity of this protozoan parasite with the closely related protozoan parasite *Toxoplasma gondii*, an IFA was also performed for *T. gondii* infection in dilution of 1:16 for positively reacted serum samples against *N. caninum*. No concordant infections of these two protozoan parasites were detected.

Conclusion: Presence of anti-*N. caninum* antibodies in camels in Iran emphasizes the necessity of further studies to detect the role of this organism as a pathogen and possibly economic importance in camels population.

Keywords: *Camelus dromedarius*, *Neospora caninum*, IFAT, Iran

* Correspondent Author: E-mail : hosseini-m@vet.sku.ac.ir

Introduction

Toxoplasma gondii and *Neospora caninum* are two closely related protozoan parasites that are distributed worldwide. Both organisms can infect a wide range of animal species and have an indirect life cycle with carnivores as the definitive hosts; domestic cats and other felidae for *T. gondii*, dogs, and coyotes for *N. caninum* (1-3).

N. caninum is one of the most important causes of abortions in ruminants (4). Participation of *N. caninum* and *T. gondii* in abortion cases of South American camelids was investigated. Results of this investigation showed that these two closely related protozoan parasites were important causes of abortions in camel population (5). Base on serologic tests, South American camelids (6, 7) and *Camelus dromedarius* (8, 9) are suggested to be potential intermediate hosts for *N. caninum* and *T. gondii*.

The aim of this study was to investigate sero-prevalence of *N. caninum* infection in *C. dromedarius*; the most popular camel species in Iran.

Materials and Methods

Animals

In this cross-sectional study, blood samples were collected from 310 camels in a slaughterhouse in Isfahan Province, Iran during 2008. Samples were centrifuged immediately and collected sera were kept in -20°C until use. The study procedure was carried out in veterinary faculty of Shahrekord University, Iran.

IFA Test

NC1 strain of *N. caninum* (10) and RH strain of *T. gondii* (11) were cultured in Vero cells and purified when they were enough for preparation of IFAT slides (12). Cell culture

derived tachyzoites were used immediately for preparation of IFAT slides.

Serum samples were diluted using phosphate buffer saline (PBS) pH 7.4 in dilutions of 1:50 and IFA test was performed. Positive samples were diluted two times more and tested again. FITC labeled anti-camel antibody that was made and evaluated in Shahrekord University, Iran was used as conjugate. Positive and negative controls were also taken from this study (13).

Results

Among 310 samples, *N. caninum* antibodies were detected in 10 (3.22%) of serum samples in dilution of 1:50. positively reacted serum samples were re-examined with a two-fold dilution. From positive serum samples, 3 (1%) had detectable IgG antibodies in dilution of 1:100.

Positively reacted serum samples with *N. caninum* tachyzoites were subjected to an indirect fluorescent antibody test to detect possible cross-reaction with *T. gondii*. None of 10 positive serum samples showed positive results in this test.

Discussion

The number of camels in Iran is more than 145000, among which a high percent are in central provinces and belongs to *C. dromedarius* species (14). These animals play a relatively important economic role in these areas as a meat source.

Serological studies suggest that camelids could potentially act as intermediate hosts for *N. caninum* (15). Investigation for determination of *N. caninum* and similar protozoan parasite; *T. gondii* as causes for abortion in Peruvian llamas showed that *N. caninum* was detected by either immunohisto-

chemistry or specific PCR in 14 out of 50 fetuses (28%) while *T. gondii* DNA was not detected in any of the analyzed fetuses (5).

A few studies have been performed for serodiagnosis of *N. caninum* in camels; 6 of 161 (3.72) camels from Egypt (8), 4.6% of 308 camels from Argentina (16) and 7 of 120 camels in Mashhad Iran were reported infected (9).

Relatively high seroprevalence of this infection in dogs in Iran (17) suggest possible role of the dogs as definitive hosts of the parasite and a possible infection source for camels in investigated area.

Acknowledgements

The authors declare that they have no conflicts of interest.

References

1. Frenkel JK. Pursuing *Toxoplasma*. J Infect Dis. 1970; 122(6):553-9.
2. McAllister MM, Dubey JP, Lindsay DS, Jolley WR, Wills RA and McGuire AM. Dogs are definitive hosts of *Neospora caninum*. Int J Parasitol. 1998; 28(9):1473-8.
3. Gondim LF, McAllister MM, Pitt WC and Zemlicka DE. Coyotes (*Canis latrans*) are definitive hosts of *Neospora caninum*. Int J Parasitol. 2004; 34(2):159-61.
4. Dubey JP and Lindsay DS. A review of *Neospora caninum* and neosporosis. Vet Parasitol. 1996; 67(1-2):1-59.
5. Serrano-Martinez E, Collantes-Fernandez E, Chavez-Velasquez A, Rodriguez-Bertos A, Casas-Astos E, Risco-Castillo V, Rosadio-Alcantara R and Ortega-Mora LM. Evaluation of *Neospora caninum* and *Toxoplasma gondii* infections in alpaca (*Vicugna pacos*) and llama (*Lama glama*) aborted fetuses from Peru. Veterinary Parasitology. 2007; 150(1-2):39-45.
6. Coppens I. Contribution of host lipids to *Toxoplasma* pathogenesis. Cell Microbiol. 2006; 8(1):1-9.
7. Dubey JP, Rickard LG, Zimmerman GL and Mulrooney DM. Seroprevalence of *Toxoplasma gondii* in llamas (*Lama glama*) in the northwest USA. Vet Parasitol. 1992; 44(3-4):295-8.
8. Hilali M, Romand S, Thulliez P, Kwok OC and Dubey JP. Prevalence of *Neospora caninum* and *Toxoplasma gondii* antibodies in sera from camels from Egypt. Vet Parasitol. 1998; 75(2-3):269-71.
9. Sadrebazzaz A, Haddadzadeh H and Shayan P. Seroprevalence of *Neospora caninum* and *Toxoplasma gondii* in camels (*Camelus dromedarius*) in Mashhad, Iran. Parasitol Res. 2006; 98(6):600-1.
10. Dubey JP, Carpenter JL, Speer CA, Topper MJ and Uggla A. Newly recognized fatal protozoan disease of dogs. J Am Vet Med Assoc. 1988; 192(9):1269-85.
11. Sabin A. Toxoplasmic encephalitis in children. J Am Vet Med Assoc. 1941; 116(801-14).
12. Schares G, Peters M, Wurm R, Barwald A and Conraths FJ. The efficiency of vertical transmission of *Neospora caninum* in dairy cattle analysed by serological techniques. Vet Parasitol. 1998; 80(2):87-98.
13. Pirali-Kheirabadi K, Mahzounieh M, Hosseinejad M, Teimori J and Taheri M. Calibration of an indirect fluorescent antibody test (IFAT), using Anti-camel IGG-FITC conjugated antibody, produced under laboratory conditions in rabbit. Journal of Camel Practice and Research. 2008; 15(1):21-3.

14. Al-Ani FK. Camel management and diseases. 2004; Al-Sharq Printing Press.
15. Wolf D, Schares G, Cardenas O, Huanca W, Cordero A, Barwald A, Conraths FJ, Gauly M, Zahner H and Bauer C. Detection of specific antibodies to *Neospora caninum* and *Toxoplasma gondii* in naturally infected alpacas (*Lama pacos*), llamas (*Lama glama*) and vicunas (*Lama vicugna*) from Peru and Germany. Vet Parasitol. 2005; 130(1-2):81-7.
16. More G, Pardini L, Basso W, Marin R, Bacigalupe D, Auad G, Venturini L and Venturini MC. Seroprevalence of *Neospora caninum*, *Toxoplasma gondii* and *Sarcocystis* sp. in llamas (*Lama glama*) from Jujuy, Argentina. Vet Parasitol. 2008; 155(1-2):158-60.
17. Malmasi A, Hosseininejad M, Haddadzadeh H, Badii A and Bahonar A. Serologic study of anti-*Neospora caninum* antibodies in household dogs and dogs living in dairy and beef cattle farms in Tehran, Iran. Parasitol Res. 2007; 100(5):1143-5.

Archive of SID