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RESEARCH ARTICLE
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Seroprevalence of *Neospora caninum* in sheep from Western Iran

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Abstract

Aim: The aim of present study was to determine the seroprevalence of *Neospora caninum* infection in aborted sheep population from Hamedan province of Iran.

Materials and Methods: 358 serum samples of aborted ewes were evaluated for IgG-antibodies to *N. caninum* using enzyme-linked immunosorbent assay (ELISA).

Results: 8 samples (2.2%) were found seropositive for this infection (2.05< Confidence interval 0.95 <2.35). Further, no statistical difference found between infection rates in different ewes age groups and fetal age groups.

Conclusion: Although the rate of infection is low but the result indicates that *N. caninum* infection may partly be responsible for abortion and economic losses in Sheep husbandry in this region.

Keywords: ELISA, Hamedan, Iran, *Neospora caninum*, sheep

Introduction

Neospora caninum is an obligate intracellular protozoan parasite that was first recognized in 1984 [1]. Wide range of domestic and wild animals has been exposed to this parasite and may play the role of intermediate host [2]. Economical, clinical, and epidemiological importance of *N. caninum* in sheep (*Ovis aries*) remains uncertain [2]. However, it has been shown that neosporosis can cause abortion, neonatal mortality and, perhaps clinical signs in sheep similar to those found in toxoplasmosis [3]. *N. caninum* has worldwide distribution [4]. Some serological studies of *N. caninum* infection have been done in different region of Iran [5-11]. However, there is no published information of *N. caninum* infection in the sheep from western Iran.

The aim of this study was to obtain sero-epidemiological information of *N. caninum* infection in aborted sheep population in Hamedan province, western Iran.

Materials and Methods

Study area: Hamedan province is located in west part of Iran (34.77°N and 48.58°E) with mountainous and mild climate.

Ethical approval : The permission was accorded by the Institutional Animal Ethics Committee to collect the sample from live sheeps.

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Sample collection: A cross-sectional study was performed during one year (April 2011 to April 2012). Blood samples were collected from total (n=358) aborted native ewes referred in Hamedan veterinary office. Information about ewe's age and age of fetus were taken from owners and from physical examination. The exact age of fetus was calculated with the help of following formula [12]:
[X= 2.1 (Y+17); X=developmental of fetal age in days, Y= length of fetal crown to anus in centimetres]

The age of ewes and fetuses were categorized into three groups (<2 yr, 2-4 yr and >4 yr in ewes and ≤ 2.5 months, >2.5 months and 24 hour after full term birth in aborted fetus).

Serology: All sera were removed after centrifugation at 800×g for 15min and stored at -20°C until laboratory testing. Anti-*Neospora* IgG-antibodies of samples were detected using a commercially available *N.caninum* ELISA (Enzyme-Linked Immuno Sorbent Assay) kit (HerdCheck® Anti-*Neospora*; IDEXX Laboratories; Switzerland) in serology section, central laboratory of Hamedan veterinary office. The kit was used according to the manufacturer's instructions. The presence or absence of antibody was determined by calculating Value% (Value% was calculated according to the manual formula). The value of ≥ 40% was considered positive.

Statistical analysis: Statistical analysis was performed by using the software package SPSS version 16.0 for windows. The differences among variables were evaluated by *Chi-square* test. *P*-value of less than 0.05 was considered statistically significant.

Results

From 358 serums of aborted ewes, eight samples (2.2%) were obtained seropositive to *N. caninum*. The significant difference was neither observed (Table-1) between infection rates in different ewes age groups (χ^2=0.017, P=0.999, df=2) nor between different fetal age groups (χ^2=0.796, P=0.671, df=2).

Table-1. Seroprevalence of *N. caninum* infection by ELISA in different variables in aborted sheep from Hamedan province, western Iran.

	Sheep age groups		
	<2yr*	**2-4yr***	**>4yr***
NS(%)	124(34.64)	231(64.52)	3(0.84)
NP(%)	6(4.8)	2(0.86)	0(0)
	Fetal age groups		
	a*	**b***	**c***
NS(%)	90(25.1)	242(67.6)	26(7.3)
NP(%)	2(2.2)	6(2.5)	0(0)

NS=number of sample, NP=number of positive, a=equal or less than 2.5 months, b=greater than 2.5 months, c= 24 hour after birth,
*=No significant difference was seen between this seropositive.

Discussion

As per our knowledge, this is the first report of *N. caninum* infection in aborted sheep from Western Iran. Due to similar climate condition and breeding manengment of western provinces, neosporosis evaluation in this region can be an adequate model for west part of Iran. Our results fall within the range of 1.1%-5.7% as recorded in other parts of Iran [10, 11]. Similar to our study, no significant difference was observed for seroprevalence between different age groups in Lorestan province of Iran [10].

The most of sheep breeding farms is traditional in Iran, and animals have a direct contact with the dog. Oocyst-contaminated pastures, fodder, and drinking water are regarded as potential sources of postnatal infection in sheep. Therefore, it is important to know which feeding practices pose an increased infection risk [4, 13].

Conclusion

N. caninum may be an important factor of abortion and economic losses of the sheep breeding in Hamedan province. Therefore, further additional researches (molecular and bioassay examination) and designing control strategies for improving management in sheep flocks is necessary.

Authors' contributions

JG: project manager and designer, sampling. GRT: technical guidance. MZ: sample examination using ELISA. All authors drafted an revised the manuscript. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no competing interests.

References

1. Bjerkas I., Mohn S.F. and Presthus J. (1984) Unidentified cyst-forming sporozoon causing encephalomyelitis and myositis in dogs, *Zoo. Parasitenkd*, 70:271-274.
2. Dubey J.P. and Schares G. (2011) Neosporosis in animals-The last five years, *Vet. Parasitol*, 180:90-108.
3. Ueno H., Goncalves P., Heinemann B., Akimoto M., Souza P. and Soares M. (2009) Prevalence of *Toxoplasma gondii* and *Neospora caninum* infection in sheep from Federal District, Central region of Brazil, *Trop. Anim. Health Prod*, 41: 547-552.
4. Dubey J.P. and Lindsay D.S. (2007) Areview of *N. caninum* and neosporosis, *Vet. Parasitol*, 67:1-59.
5. Gharekhani J., Heidari H. and Akbarein H. (2012) Seroepidemiology of *Neospora caninum* in Iranian native and crossbreed cattle: A cross sectional study, *J. Vet. Res*, 67(4): 325-329.
6. Yakhchali M., Javadi S. and Morshedi A. (2010) Prevalence of antibodies to *Neospora caninum* in stray dogs of Urmia, Iran, Parasitol. Res, 106(6):1455-1458.
7. Hajikolaei M.R.H., Goraninejad S., Hamidinejat H., Ghorbanpour M., Paryab R. (2007) Occurrence of *N.caninum* antibodies in water buffaloes (Bubalus bulalis) from the South-Westhern region of Iran, *Bull. Vet. Inst. Pulawy*, 51:233-235.
8. Sadrebazzaz A., Haddadzadeh H.R. and Shayan P. (2006) Seroprevalence of *N.caninum* and *T.gondii* in camels (Camelus dromedarius) in Mashhad, Iran, *Parasitol. Res*, 98:600-601.
9. Hosseini M.H., Moraveji M., Tahamtan Y., Rahimian A., Mohammadi G.H. and Namavari M.M. (2011) Sero-prevalence of *Neospora* spp. in horses in Northeast of Iran, *Iran. J. Parasitol*, 6(2):64-68.
10. Ezatpour B., Alirezaei M., Hassanvand A., Zibaei M. and Azadpour M. (2012) The first report of *Neospora caninum* prevalence in aborted and healthy sheep from Lorestan province of Iran, *Asian. Pac. J. Trop. Biomed*, 1:1-3.
11. Asadpour R., Jafari-Joozani R. and Salehi N. (2012) Detection of *Neospora caninum* in ovine abortion in Iran, *J. Parasitic. Dis*. 31(1):105-109.
12. Noakes D.E., Parkinson T.J. and England G.C.W. (2009) Veterinary Reproduction and Obstetrics, (Saunders,USA).
13. Dubey J.P., Schares G. and Ortegamora L.M. (2007). Epidemiology and control of Neosporosis and *N. caninum*, *Clin. Microb. Rev*, 20:323-369.

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