RESEARCH ARTICLE

Serodiagnosis of ovine neosporosis in Mosul city, Iraq

Maab AL-Farwachi*, Basima AL-Badrani, Wesam AL-Khafaji

Abstract


Aim: The aim of this study was to determine the serodiagnosis of Neospora caninum by indirect enzyme linked immunosorbent assay (iELISA) among ewes in Mosul city.

Materials and Methods: Totally 288 sheep sera obtained from six farms were examined for antibodies against Neospora caninum by iELISA.

Results: Antibodies were found in 35 ewes (12.2%) with prevalence of 7.3, 10.4 and 18.8% in the aborted ewes, pregnant ewes, and in the healthy non pregnant animals, respectively.

Conclusion: This is the first evidence of Neospora caninum antibodies in sheep from Mosul city.
Introduction

Ovine neosporosis is a coccidian parasite (Dubey et al. 2002), that was first recognized in dogs in 1984 (Bjerkas et al. 1984) and was described as a new genus Neospora, type species Neospora caninum in 1988 (Dubey et al. 1988). Cattle and other ungulates such as sheep, goats, horses, white-tailed deer, camels and water buffaloes may act as natural intermediate hosts (Dubey 2003, Chavez-Velsquez et al. 2004, Rodrigues et al. 2004). Canids such as dogs are the definitive host (McAllister et al. 1988). Infection in sheep is transmitted either transplacentally or by ingestion of sporozoite-containing oocysts shed by definitive host (West et al. 2006). This has resulted in repetitive abortion, mummified fetus or neonatal that physically healthy, but congenitally infected relative to the gestation stage of the adult sheep (Hassig et al. 2003). Cerebral neosporosis was detected in adult Merino sheep (Bishop et al. 2010).

Generally, the diagnosis of Neospora caninum associated abortion has relied on the histological examination of infected fetuses (Dubey et al. 2006). Other methods used to study Neospora caninum include isolation of the parasite in cell culture (Lei et al. 2005), an indirect fluorescent antibody test on various body fluids (Rahman et al. 2011), immunohistochemistry (Boger and Hattel 2003) and a variety of ELISA (Jenkins et al. 2005, Gaturaga et al. 2005). The detection of specific anti-neospora caninum antibodies in sera of sheep has been useful for the diagnosis of disease and may also prove suitable for seroepidemiologic investigations (Abo-Shehada and Abu-Halaweh 2010, Munhoz et al. 2010, Rahman et al. 2010). In Iraq little is known about the serodiagnosis of Neospora caninum in naturally exposed sheep.

The aim of this research was to investigate the existence of Neospora caninum specific antibody in the sera of sheep in Mosul.

Materials and Methods

A 288 sera (96 sera from healthy non pregnant ewes, 96 sera from aborted animals and 96 sera from pregnant ewes, Mosul, Iraq) were collected from local breed ewes (3-6 years old) coming from six farms during April 2011 to April 2012. A commercial indirect ELISA kit (IDvet innovative Diagnostics, France) for detection of antibodies against Neospora caninum in serum was used. All sera were tested according to the manufacturer’s instructions, then read the optical densities in the microwells using a micro plate reader at a wavelength of 450 nm. ELISA optical density (OD) reading was transformed to serum/positive percentage (S/P) according to a specific equation cited by manufacturer. The data management and statistical analysis by two-ways analysis of variance were performed using SPSS 10.1 software for windows.

Results

The results of study showed that the total percentage of seropositive of Neospora caninum antibodies was 12.2 (Table 1). The percentage of seropositive values (S/P %) was significantly higher in the aborted animals than in other animals (Table 2).

<table>
<thead>
<tr>
<th>Origin of examined sera</th>
<th>Number of sera tested</th>
<th>Number of seropositive (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From pregnant ewes</td>
<td>96</td>
<td>10/96 (10.4)</td>
</tr>
<tr>
<td>From aborted ewes</td>
<td>96</td>
<td>7/96 (7.3)</td>
</tr>
<tr>
<td>From healthy non pregnant ewes</td>
<td>96</td>
<td>18/96 (18.8)</td>
</tr>
<tr>
<td>Total</td>
<td>288</td>
<td>35/288 (12.2)</td>
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</tbody>
</table>

Table 2. Distribution of the percentage of serum/positive values for N. caninum seropositive ewes.

<table>
<thead>
<tr>
<th>Origin of examined sera</th>
<th>% of serum/positive</th>
</tr>
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<tbody>
<tr>
<td>From pregnant ewes</td>
<td>43.8±2.1</td>
</tr>
<tr>
<td>From aborted ewes</td>
<td>164.3±2.2*</td>
</tr>
<tr>
<td>From healthy non pregnant ewes</td>
<td>21.5±2.0</td>
</tr>
</tbody>
</table>

*Statistically significant p<0.05.

Discussion

This is the first serodiagnosis of ovine neosporosis in the Mosul city, Iraq. In this study, an antibodies against Neospora caninum was detected in the 35 of 288 sera. Serological surveys indicate wide spread exposure to Neospora caninum in dairy and beef cattle and sheep in many parts of the world (Abo-Shehada and Abu-Halaweh 2010, Munhoz et al. 2010, Rahman et al. 2011). Although there is no published information on the epidemiology of Neospora caninum in sheep in Mosul city, there are many serological studies of canine, bovine and ovine neosporosis in the local countries as Iran (Haddadzadeh et al. 2007, Nourollah Fard 2008, Salehi et al. 2010), Turkey (Akca et al. 2005, Kurtdede et al. 2006, Simsek et al. 2008) and Jordan (Al-Majali et al. 2008, Abo-Shehada and Abu-Halaweh 2010).

This diagnosis of neosporosis in the live animal can be achieved by detection of anti-Neospora caninum antibodies using different serological tests, but ELISA is an approved serological test (Von Blumroder et al. 2004). ELISA is the most suitable for high through put screening of antibodies to parasites, which has been used in epidemiological studies to estimate the prevalence of Neospora caninum infection and to examine the relationship between exposure to Neospora caninum and abortion, milk yield and culling in cattle (Hernandez et al. 2002). Some researchers have recommended that the serological status of the herd be determined to obtain information about the risk of abortion and attributable to Neospora caninum infection.
In this study, the percentages of seropositive were 10.4, 7.3 and 18.8% in the pregnant animals, aborted ewes and healthy non pregnant ewes respectively. Review of a new published data indicates that *Neospora caninum* is a primary abortive agent in ewes (Hassig et al, 2003, Howe et al 2008). Several studies demonstrate that chronically infected seropositive cows have an about two-to three fold increased risk of abortion compared to seronegative dams (Wouda et al 1998, Pfeiffer et al 2002). Thurmond and Hietala (1997) observed a 7.4-fold higher risk of abortion during the first gestation of congenitally infected heifers.

The percentage of seropositive values was significantly higher in the aborted animals than in other animals which reflect the high concentration of antibodies against neosporosis, as also in the previous serological studies showed the aborted dams from herd with endemic bovine abortion have higher antibodies against specific antigens (Schares et al 2000). Other researcher has also shown that the high antibody titers are found in post abortion sera and during the second part of pregnancy (Quintanilla-Gozalo et al 2000, Schares et al 2000).

**Conclusions**

This the first report of serodiagnosis of bovine neosporosis in Mosul, Iraq. Results showed the presence of the disease; however, further epidemiological studies are needed to provide a better understanding of neosporosis under local conditions.

**Acknowledgments**

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**References**


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11-24.


