Detection of *Toxoplasma gondii* and *Neospora caninum* antibodies in cattle in Mosul city, Iraq

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**Abstract**

The study was conducted on the one hundred sera of local breed cattle in Mosul city, Iraq. All sera were tested for presence of *Neospora caninum* and *Toxoplasma gondii* antibodies by using indirect enzyme linked immunosorbent kits. Results showed that 30% was positive for *Toxoplasma gondii* while *Neospora caninum* showed a positive of 20%. Mixed infections were found in one animal only (1%). This result indicates that Toxoplasmosis is much more widespread than neosporosis in cattle living in the Mosul city, Iraq.

**Introduction**

*Toxoplasma gondii* and *Neospora caninum* are closely related Apicomplexan parasites which are morphologically similar but possess some structural, molecular and antigenic differences (1, 2). They have similar life-cycles with different feline hosts, the felids (3) and canids (4) respectively, and both parasites have similar intermediate hosts including a wide range of mammals (5, 6, 7). Both parasites causing abortion and fetal abnormality in cattle (8, 9). Previous serological investigations have shown that antibodies to both parasites were present in several species including cattle (10), sheep (11), and dogs (12). This work is a comparative seroprevalence of bovine toxoplasmosis and neosporosis in Mosul, Iraq.

**Material and methods**

A total of 100 sera were collected from local breed cattle (3–10 years old) from different regions in the Mosul city, Iraq during the period from July 2011 to April 2012. A commercial ELISA kit (Bio – X *Neospora caninum*, Indirect ELISA kits) for detection of antibodies against *Neospora caninum* in bovine serum was used, the kit has been supplied from Bio – x Diagnostics – Belegique. The test uses 96-well microtitration plates sensitized by a purified *Neospora caninum* protein. The plates odd columns (1, 3, 5, 7, 9, and 11) contain the purified protein, while the even columns (2, 4, 6, 8, 10, and 12) contain a control antigen. We thus have a genuine negative control. Using such a control reduces the number of false positive considerably. All sera were tested according to the manufacturers 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 were transformed to serum / positive percentage (S/P) according to a specific equation cited by manufacturer. The sample considered positive if it gives S/P % > 15 %, 10 % < S/P % < 15 % considered doubtful, but S/P % < 10 % considered negative. S/P = Delta OD sample / Delta OD positive X 100. All sera were also tested by a commercial kit (ELISA T. gondii serum screening, Institut Pourquier, Montpellier, France). The serum was positive if more than 50% S/P was found.

**Results**

From a total of 100 cows, 30 (30%) were positive for *T. gondii* and 20 (20%) for *N. caninum*. One animal (1%) had detectable antibodies against both *N. caninum* and *T. gondii*. *T. gondii* was of higher seropositive in healthy non pregnant cows and more in comparison with aborted and pregnant cows (Table 1). Healthy non pregnant cows had a lower rate of infection than aborted and pregnant cows (Table 2).
Table 1: Percentages of seropositive for *T. gondii* in cattle in Mosul city, Iraq

<table>
<thead>
<tr>
<th>Origin of sera</th>
<th>Number of examined</th>
<th>Number of seropositive (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From healthy non pregnant cows</td>
<td>30</td>
<td>17 \ 30 (56.7)</td>
</tr>
<tr>
<td>From pregnant cows</td>
<td>35</td>
<td>7 \ 35 (20.0)</td>
</tr>
<tr>
<td>From aborted cows</td>
<td>35</td>
<td>6 \ 35 (17.1)</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>30 \ 100 (30.0)</td>
</tr>
</tbody>
</table>

Table 2: Percentages of seropositive for *N. caninum* in cattle in Mosul city, Iraq

<table>
<thead>
<tr>
<th>Origin of sera</th>
<th>Number of examined</th>
<th>Number of seropositive (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>From aborted cows</td>
<td>35</td>
<td>11 \ 35 (31.4)</td>
</tr>
<tr>
<td>From pregnant cows</td>
<td>35</td>
<td>7 \ 35 (20.0)</td>
</tr>
<tr>
<td>From healthy non pregnant cows</td>
<td>30</td>
<td>2 \ 30 (6.7)</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>20 \ 100 (20.0)</td>
</tr>
</tbody>
</table>

Discussion:

In the present study 30 out of 100 sera (30.0%) of cows were positive for the presence of antibodies to toxoplasmosis infection. This study showed lower seroprevalence than prevalence studied by Moreno et al., 1991 (13) were found in Spain at 41%, Poland 53% (14), Serbia 76.3% (15), and Brazil 71% (16). The same prevalence of infection (30%) in buffaloes also reported in Mosul city, Iraq (7), while lower prevalence of infection in cattle also reported in some countries such as Tanzania (17), France (18), and Malaysia (19). The difference in seroprevalence in cattle in different countries may reflect different climatic factors. Cats are common pets kept in most families in Iraq and often found in public places. An increase in the number of cats causes increase of toxoplasmosis infection (4).

In this study the percentages of seropositive were 6.7, 20.0 and 31.4% in the healthy non pregnant animals, pregnant cows and aborted cows respectively. Review of all published data indicate that *Neospora caninum* is a primary abortifacient in cattle (20, 21) and *Neospora caninum* infection is generally latent and asymptomatic in non pregnant cattle, although bovine neosporosis in pregnant cow is associated with repeated abortion and birth of clinically healthy but persistently infected calves (22). Several studies demonstrate that chronically infected seropositive cows have an about two – to three fold increased risk of abortion compared to seronegative dams (23-24). Thurmond and Hietala (1997) (25) 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 (26). Other researcher has also shown that the high antibody titer are found in post abortion sera and during the second part of pregnancy (26, 27).In conclusion, the results of the present study suggest that is an important factor in the economic losses of the dairy industry in this region of Iraq, and appropriate management and control strategies need to be practiced by dairy farmers in this area. This could be due to the animals owners unawareness to the vaccination programs and also the regions characteristics. The region is illegal animal trade occur from time to time. Further epidemiological studies are needed to provide a better understanding of neosporosis and toxoplasmosis under local conditions.
References


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الكشف عن اضداد المقوسات الكوندية والنيوسيبورا الكلبية في الإبقار في مدينة الموصل، العراق

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الخلاصة

أجريت الدراسة على عينة مصل كانت تعود للإبقار المحلية في مدينة الموصل، العراق. أُقيمت جميع العينات للكشف عن تواجد اضداد المقوسات الكوندية والنيوسيبورا الكلبية باستخدام عدة الألزامات غير المباشرة. أظهر النتائج أن 30% من الأممال كانت موجبة لترشيح اضداد المقوسات الكوندية، بينما كانت 20% من العينات موجبة لترشيح اضداد النيوسيبورا الكلبية. ولاحظ الخمج المختلط في حيوان واحد فقط (1%). وتبيان النتائج الحالية إلى داء المقوسات هو الأكثر انتشارًا من داء النيوسيبورا. في الإبقار الموجود في مدينة الموصل، العراق.