Detection of *Toxoplasma gondii* Antibodies and Some Helminthic Parasites in Camels from Nevsehir Province of Turkey

Utuk, A. E., 1 Kirbas, A., 2 Babur, C. 3 and Balkaya, I. 4

1 Central Veterinary Control and Research Institute Parasitology and Bee Diseases Laboratory, Ankara, Turkey.
2 Ataturk University, Faculty of Veterinary Medicine, Department of Internal Medicine, Erzurum, Turkey.
3 Refik Saydam National Hygiene Center, Communicable Diseases Research Department, Parasitology Laboratory, Ankara, Turkey.
4 Ataturk University, Faculty of Veterinary Medicine, Department of Parasitology, Erzurum, Turkey.

**Corresponding Author:** Dr. Armağan Erdem UTUK, Central Veterinary Control and Research Institute, Parasitology and Bee Diseases Laboratory, 06020, Ankara, Turkey. Phone: + 90 312 326 00 90/ 141, Fax: + 90 312 321 17 55, e-mail: erdemutuk@hotmail.com

**ABSTRACT**

This study was conducted on 11 camels, ranging in age from 2 months to 40 years. The aim of this study was to detect the *Toxoplasma gondii* antibodies and helminth parasites in camels. *T. gondii* antibodies were detected by Sabin-Feldman Dye Test (SFDT), and faecal samples were examined by Fulleborn flotation and Benedek sedimentation methods. As a result of the study, *T. gondii* antibodies were detected in 10 out of 11 (90.9%) camels. Detected helminths consisted of 63.63% (7/11) *Trichostrongylidae* spp., 45.45% (5/11) *Trichuris* spp. and 9.09% (1/11) *Dicrocoelium dendriticum*.

**Key words:** Camel, helminth, *Toxoplasma gondii*, Turkey.

**INTRODUCTION**

According to 2009 statistics, the camel population in Turkey was 1041. Camels suffer from various endo- and ectoparasitic diseases which cause economic losses such as decreased working capacity, growth and production (1, 2).

Data related to camel parasites in Turkey are very limited. *Trichostrongylidae* spp., *Trichuris* spp., *Dicrocoelium dendriticum*, *Eimeria* spp., *Dipetalonema evansi*, *Hydatid cysts* and *Cephalopina titillator* are known camel parasites in Turkey (3, 4, 5, 6). However, we could not find any reports in Turkey with respect to the existence of *T. gondii* antibodies in camels. The aim of this study was to detect the *T. gondii* antibodies and helminth parasites of camels in Nevsehir province of Turkey.

**MATERIAL AND METHODS**

**Sample collection**

In this study, a total of eleven camels (8 male and 3 female), ranging in age from 2 months to 40 years, were examined. Blood and fecal samples were collected from the camels in June 2010 from Nevsehir province of Turkey. Blood samples were taken from the jugular vein without anticoagulant and left to clot overnight at 4°C. Sera were removed after centrifugation at 2000 rpm for 5 minutes, decanted into 1.5 ml plastic tubes and stored at -20°C until use.

**Coprologic and serologic examination**

Faecal samples were taken from the rectum, collected in glass bottles and transported to the laboratory on ice. Faecal samples were processed and examined microscopically on the same day. The Sabin–Feldman Dye Test (SFDT) (7) was carried out at Ankara Refik Saydam National Hygiene Center to detect anti-*T. gondii* antibodies. 1:16 and greater titers were accepted as positive.

Faecal samples were examined by conventional Fulleborn flotation and Benedek sedimentation methods. The ova identification was carried out according to Soulsby and Kassai (8, 9).
RESULTS

At the end of the study, it was found that 9 out of 11 (81.81%) camels were infected by one or more species of worms. Detected helminthes consisted of 63.63% (7/11) Trichostrongyloidea spp., 45.45% (5/11) Trichuris spp. and 9.09% (1/11) D. dendriticum. Furthermore, we detected anti-T. gondii antibodies in 10 out of 11 (90.90%) samples. The percentages were 87.50% (7/8) in males and 100% (3/3) in females. Study results are presented in Table 1 and Table 2.

Table 1: Incidence of helminthes in camels

<table>
<thead>
<tr>
<th>parasites</th>
<th>total samples</th>
<th>infected animal</th>
<th>percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trichostrongyloidea spp.</td>
<td>11</td>
<td>7</td>
<td>63.63</td>
</tr>
<tr>
<td>Trichuris spp.</td>
<td>11</td>
<td>5</td>
<td>45.45</td>
</tr>
<tr>
<td>D. dendriticum</td>
<td>11</td>
<td>1</td>
<td>9.09</td>
</tr>
</tbody>
</table>

DISCUSSION

Bajana et al. (10), Aypak (11), and Parsani (1) reviewed the parasites of camels. According to these researchers, camels’ common gastrointestinal nematodes are Haemonchus, Nematodirella, Nematodirus, Trichostrongylus, Strongyloides, Oster tagia, Marshballagia, Cooperia, Trichuris and Camelostongylus. Among extra intestinal nematodes Onchocerca fasciata, O. armillata, O. gutturos a, D. evansi, Thelazia leesi, Dictyocaulus camel i, Protostrongylus spp., Cystocaulus spp., Muellerius spp., have been reported in camels. Trematodes of major importance in camels are Fasciola gigantica, F. hepatica, Schistosoma spp., Eurytrema pansacri-ticum, D. dendriticum and Paramphistomum spp. Cestodes reported in camels are Moniezia spp., Stilesia spp., Avitellina spp., Tysanosoma actinoides, Hydatid cyst, Cysticercus tenuicol-liis, C. dromedarii and Coenurus cerebralis. Various protozoan parasites, Trypanosoma evansi, Theileria spp., Sarcocystis spp., T. gondii, Balantidium coli and Eimeria spp., have been reported in camels.

Merdivenci (4), found D. evansi from the connective tissue of camel testis in Mersin, a province in southern Turkey. Dincer et al. (6), identified C. titilator in the nostril of one camel in Aydin, a province in western Turkey. At the same province, Eren et al. (3), studied on 150 camels and found the prevalences of Trichostrongylidae spp., 38.66%, Trichuris spp., 10.66%, D. dendriticum %7.33, Eimeria spp., 4.66%. They reported that 2 of 6 slaughtered camels were infected with Hydatid cysts. Utuk et al. (5), found hydatid cysts in one camel from Sanliurfa, a southeastern province of Turkey. For further discrimination, they examined the cyst material by Polymerase Chain Reaction-Restriction Fragment Length Polymorphism (PCR-RFLP) and DNA sequencing. Obtained sequence data were identified as corresponding to the common sheep strain (G1) of Echinococcus granulosus. In this study, we studied on 11 camels and detected Trichostrongyloidea spp., 63.63% (7/11) Trichuris spp. 45.45% (5/11) and 9.09% (1/11) D. dendriticum.

Toxoplasma gondii antibodies in camel sera were reported from Saudi Arabia, mid-Eastern Sudan and Egypt. Seroprevalence of T. gondii in these countries were 16% (227/1366), 67% (327/482) and 17.4% (29/166), respectively (12, 13, 14). However, we could not find any report in Turkey with respect to the existence of T. gondii antibodies in camels. In this study, we detected T. gondii antibodies in 10 out of 11 (90.9 %) camels.

Study results indicated that helminth infections and T. gondii antibodies are prevalent among camels in Nevsehir. By comparison with other farm animals, high prevalence of T. gondii cannot be a public health problem in Nevsehir, as camels are bred only for touristic purposes. At the end of the study, we gave information to camel owners with regard to treatment, protection and importance of parasitic diseases. We consider that further studies in camels should be conducted in different seasons and at different parts of Turkey.

Table 2: Number of male and female camels seropositive to T. gondii at different dilutions

<table>
<thead>
<tr>
<th>Sex</th>
<th>No of animals</th>
<th>Negative</th>
<th>Positive</th>
<th>Percentage</th>
<th>Titers of Seropositivity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1/16</td>
<td>1/64</td>
<td>1/256</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>8</td>
<td>1</td>
<td>7</td>
<td>87.50</td>
<td>3</td>
</tr>
<tr>
<td>Female</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>100.0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>1</td>
<td>10</td>
<td>90.90</td>
<td>4</td>
</tr>
</tbody>
</table>
REFERENCES