Prevalence of Cryptosporidium spp. Oocysts in Diarrhoeic Calves in Kars Province, Turkey

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Abstract: This study was carried out to determine the prevalence of Cryptosporidium spp. oocysts in diarrhoeic calves in Kars province. The study was conducted between February 1999 and June 1999, involving 140 diarrhoeic calves from 8 different localities (Kars-Central district, Karakaş, Bulanık, Karakale, Hachalil, Bogazköy, Susuz-Central district, and Arpaçay). These localities were visited once during the study period, and fresh faecal samples were taken from the rectums of the calves up to 3 months old. Faecal samples were centrifuged and the resulting sediments were smeared on glass slides. The slides were stained by the modified acid-fast technique and examined under light microscope for the presence of Cryptosporidium spp. oocysts.

Cryptosporidium spp. oocysts were detected in 25.7% (36/140) of the diarrhoeic calves examined. The infection rate varied from 9.1% (1/11) in the Susuz-Central district to 37.5% (6/16) in Arpaçay. The infection rate was 29.5% (33/112) in calves younger than 1 month of age while it was 10.7% (3/28) in calves older than 1 month of age. The highest infection rate of 42.6%, (20/47) was recorded in calves between 1 and 3 weeks of age.

Key Words: Cryptosporidium spp., Calves, Prevalence, Kars, Turkey.

Kars İlinde İshallı Buzağılarda Cryptosporidium spp. Oocyst’lerinin Yayılışı


Muayene edilen hayvanların %25.7 (36/140) sinde Cryptosporidium spp. oocyst’lerine rastlanmıştır. Yeşil kesim yerlerine göre enfeksiyon oranları %6.1-37.5 arasında değişmiştir. Cryptosporidium’ların yayılımı bir aylık kadar olan buzağılarda %29.5, bir aylıkta büyüklerde ise %10.7 olarak belirlenmiştir. Cryptosporidium oocyst’lerine en yüksek oranda (% 42.6) 1-3 haftalık buzağılarda rastlanmıştır.

Anahtar Sözcükler: Cryptosporidium spp., Buzağı, Yayılış, Kars.

Introduction

Cryptosporidium spp. (Apicomplexa: Cryptosporidiidae) are among the most important coccidian parasites of mammals, birds, reptiles and fish, and are distributed worldwide. These protozoan parasites mainly infect the intestinal tract and rarely the respiratory tract of animals and people. Cryptosporidium parvum and C. muris are significant species, causing disease in mammals (1,2). Cryptosporidium are not host specific so that cross-infection can occur within and between animal species and people.

Cryptosporidium spp. cause an emerging zoonotic disease, Cryptosporidiosis, in a wide range of animals, including newborn ruminants and people. The disease is
characterised clinically by profuse, watery, sometimes mucous, blood-stained diarrhoea, dehydration, emaciation, anorexia, tenesmus and abdominal pain. Disease is more severe and lethal when complicated with other enteropathogens such as E. coli, Salmonella, Rotavirus, Corona virus infections, and in immuno-compromised individuals (3,4).

Cryptosporidiosis is prevalent in calves and appears to be age related. Infection with Cryptosporidium is more commonly reported in calves between 1 and 3 weeks of age (3,5-8).

Studies conducted using different research groups (9-12), have revealed that the prevalence of Cryptosporidiosis in diarrhoeic calves varies between 14.4% and 63.6% (13-16).

Cryptosporidiosis was first diagnosed in calves in Turkey in 1984, which led to several regional studies of the disease (17). Although these studies revealed the prevalence of Cryptosporidiosis to be between 7.2% and 63.3% in diarrhoeic calves (18-21), no prevalence study has been carried out in Kars province, where intensive indoor cattle husbandry is common.

This study was conducted to determine the prevalence of Cryptosporidium spp. oocysts in diarrhoeic calves in Kars.

Materials and Methods

This study was carried out between February 1999 and June 1999 in 8 different localities (Kars-Central, Karakaş, Bulanık, Karakale, Boğazköy, Susuz-Central and Arpaçay). The animals used in this study were diarrhoeic calves up to 3 months of age. Only one visit was made to each locality and faecal samples were collected from the rectums of the animals. Each sample was put in a sterile plastic bag and taken to the laboratory.

Faecal samples were centrifuged and faecal smears were prepared on glass slides from the resulting sediment. Air or flame dried slides were stained by the modified acid-fast technique and examined under light microscope with 10X40 magnification (22).

Results

The frequency of Cryptosporidium spp. oocysts was 25.7% (36/140) in diarrhoeic calves in Kars province (Table 1). When reassessed according to localities, the frequency varied from 9.1% (1/11) in Susuz-Central to 37.5% (6/16) in Arpaçay (Table 1).

<table>
<thead>
<tr>
<th>Localities</th>
<th>X/n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kars-Central</td>
<td>5/24</td>
<td>20.8</td>
</tr>
<tr>
<td>Hacılılı village</td>
<td>4/13</td>
<td>30.8</td>
</tr>
<tr>
<td>Karakaş village</td>
<td>7/21</td>
<td>33.3</td>
</tr>
<tr>
<td>Susuz-Central</td>
<td>1/11</td>
<td>9.1</td>
</tr>
<tr>
<td>Bulanık village</td>
<td>5/22</td>
<td>22.7</td>
</tr>
<tr>
<td>Karakale village</td>
<td>3/10</td>
<td>30.0</td>
</tr>
<tr>
<td>Boğazköy</td>
<td>5/23</td>
<td>21.7</td>
</tr>
<tr>
<td>Arpaçay</td>
<td>6/16</td>
<td>37.5</td>
</tr>
</tbody>
</table>

Total 36/140 25.7

x: Number of animals infected
n: Number of animals examined

The frequency of Cryptosporidium spp. oocysts with respect to the age of calves is given in Table 2. Cryptosporidium spp. oocysts were detected in calves as young as 3 days old. Calves were recategorised as 1 month old or younger (112 calves), and between 1 and 3 months (28 calves). The frequency of Cryptosporidium spp. oocysts was 29.5% (33/112) in diarrhoeic calves 1 month old or younger and 10.7% (3/28) in calves between 1 and 3 months old. In 36 calves infected with Cryptosporidium spp. oocysts, diarrhoea was yellowish, watery or mucous in 66.7% (24/36) and grey, greenish or stained with blood in 33.3% (12/36).

Cryptosporidium spp. oocysts 4.7 µm (3.10-5.61 µm) in diameter, were seen as red cells against a blue background with irregularly distributed black granules in it (Figures 1, 2).

<table>
<thead>
<tr>
<th>Age</th>
<th>X/n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-7 days</td>
<td>8/41</td>
<td>19.5</td>
</tr>
<tr>
<td>8-14 days</td>
<td>11/23</td>
<td>47.8</td>
</tr>
<tr>
<td>15-21 days</td>
<td>9/24</td>
<td>37.5</td>
</tr>
<tr>
<td>22-30 days</td>
<td>5/24</td>
<td>20.8</td>
</tr>
<tr>
<td>&gt;1 month-90 days</td>
<td>3/28</td>
<td>10.7</td>
</tr>
</tbody>
</table>

x: Number of animals infected
n: Number of animals examined

Table 1. Regional prevalence of Cryptosporidium spp. oocysts.

Table 2. Prevalence of Cryptosporidium spp. oocysts in diarrhoeic calves according to age.
Discussion

Bovine Cryptosporidiosis is reported from all over the world (9-12). Its prevalence appears to be age and management related, especially when overcrowded, unhygienic housing and improper feeding regimens are practiced (3,4).

The prevalence of Cryptosporidium spp. oocysts in diarrhoeic calves was reported to be 47.7% in France (13), 16.5% in Israel (14), 63.6% in Brazil (15) and 14.4% in Korea (16).

In Turkey, prevalence studies carried out in diarrhoeic calves in Ankara (18,19), Elazığ (20) and Aydın (21) revealed the figures of 48.8-63.3%, 7.2% and 20.6% respectively. The prevalence figure (25.7%) found in the present study was in accordance with the studies mentioned above. The prevalence was higher in animals younger than 1 month old. The infection rate was the highest in calves between 1 and 3 weeks of age. These findings are also similar to the results of other studies.

In this study there was a difference in the prevalence figures obtained from different localities. This may be due to different management systems applied by farmers, but no information about animals and management systems was collected to explain this difference.

This was the first study with the aim of determining the prevalence of Cryptosporidium spp. oocysts in calves suffering from diarrhoea in Kars province. This study partially revealed the aetiology of diarrhoea in calves, which should lead the clinician to consider Cryptosporidium spp. a cause of diarrhoea and form a base for more broad and detailed epidemiological studies on Cryptosporidium spp. infection in this region and Turkey.

References


