Abstract

This study was performed between December 2000 - May 2005 to detect parasitic diarrhoea agents in neonatal and young calves. In this period, faecal samples were obtained from 231 neonatal and young calves. Age of the calves ranged from 1 day to 8 months. Faecal samples were examined using native Lugol’s solution, Fulleborn’s salty water technique and modified Ziehl–Neelsen staining technique for Cryptosporidium. The parasitological examination revealed that 188 (81.3%) of the calves were infected with one or more parasitic agents.

Key words: calves, diarrhoea, parasites.

Diarrhoea of neonatal and young calves is a common disease seen in cattle. Most common parasitic agents responsible for the disease are parasites such as Giardia, Cryptosporidium, Eimeria and Toxocara vitulorum. However, bacterial and viral agents and nutritional factors also play role in the diarrhoea (11).

Giardia intestinalis (or lamblia) is a water borne protozoon which infects all mammals. The infection takes place by faecal–oral route. Cysts of G. intestinalis, shed by faeces, are ingested orally via water, milk and feed. Giardia bovis which causes infection in cattle is in the same genus as G. intestinalis. This parasite can be detected as early as in 14 d old calves. It can be seen at every age but it is most common in calves 2–3 month old. Mucoid and fatty stool, weight loss, and growth retardation are the main disease symptoms (11, 33, 34).

Cryptosporidium parvum is a protozoon which is spread by faecal–oral route. Infected calves do not show diarrhoea unless their immune system is depressed. Diarrhoea is diffuse, watery, and yellow in colour. Undigested milk, blood, fibrin and mucus can be found in stool. Diarrhoea is persistent and fatal in immune–depressed humans and animals. Anaemia, hypoproteinaemia, and dehydration can be seen due to destruction of the small intestines. Some genotypes of C. parvum can pass to humans from animals. Calves can be infected with Cryptosporidium at the age from 1 to 3 weeks. Incubation period is approximately 4 d (11, 21, 33).

Different Eimeria species can be seen in neonates and young calves but those which cause disease symptoms in the form of bloody or non-bloody diarrhoea are Eimeria zurnii and Eimeria bovis. Infection can be seen in calves of all age but it is more severe in 3 week–6 month old animals. Epidemics occur especially during the first month after birth. Incubation period is 17–21 d. The disease occurs due to stress, improper sanitation and sudden feed changes (11, 13, 22, 30).

Toxocara vitulorum is a nematode which lives in the small intestines in cattle, water buffalos, and zebu and may also cause diarrhoea together with anaemia, weight loss, and anorexia in 1-3 month aged calves. Infection rate is the highest in 1-3 month old calves and decreases as the animal gets older (1, 3, 5, 18).

Buxtonella sulcata also can be cause of diarrhoea in calves. Rate of diarrhoea was detected higher in calves having B. sulcata cysts compared with calves without the cysts (19). B. sulcata (Kingdom: Protozoa, Phylum: Ciliophora, Class: Kinetoflagminophorea, Order: Trichostromatidae, Family: Pyenotrichidae, Genus: Buxtonella) is a ciliate and lives in cyst form at the environment. These cysts are oval or round, and 52 – 131 µm in diameter. The cyst is surrounded by a two layered capsule with cilia. Vegatative forms live in the colon of cattle. Infections occurs after ingestion of feed or water contaminated with cysts (32).

Entamoeba seen in cattle is E. bovis. Entamoeba species are not pathogens in ruminants (33).

Eimeria, Cryptosporidium, Giardia and T. vitulorum are the most common parasites causing diarrhoea in neonatal and young calves. This study was done to search the role of the parasites as etiological agents of diarrhoea in cattle.
Material and Methods

The study was performed on 231 calves (159 male and 72 female), ages of which ranged between 1 d and 8 months and which were brought to the Internal Medicine Clinics, Yüzüncü Yıl University, with diarrhoea complaint. According to anamnesis information, antibacterial treatment was applied to the most of the calves before the collecting of faeces. Faecal samples, taken from the rectum to the plastic container, were examined by native Lugol’s solution, Fulleborn’s salty water flotation technique and modified Zielh–Neelsen staining technique for Cryptosporidium (7). According to results of the parasitological examination, antiparasitological treatment was applied. Calves having no parasites were treated against other diarrhoea agents.

Results

Parasitological examination revealed one or more parasites in 188 (81.3%) calves. The most commonly found parasite was Eimeria sp. Oocysts of the parasite were demonstrated in 147 (63.6%) calves. Entamoeba sp. was least common parasite and only 15 (6.4%) calves had entamoeba cysts and trophozoites (Table 1). Forty three (18.6%) calves had Cryptosporidium oocysts, 41 (17.7%) Toxocara vitulorum, 34 (14.7%) Giardia sp. cysts and trophozoites, and 37 (16%) Isospora oocysts. Buxtonella sulcata, which may be causative agent of diarrhoea, was found alone in 6 calves and together with Eimeria sp. oocysts in 16 calves (9.5%).

Seventy-four (32%) calves were infected with one parasite, 78 (33.7%) with two parasites and 36 (15.5%) with 3 parasites. From 188 calves in which parasites were found, 68 calves were 15 d - 1 month old, 63 calves were 1-3 month old and 57 calves were 3-8 month old. The age of calves having no parasites ranged from 1 to 15 d.

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Number of infected calves</th>
<th>Infection rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eimeria sp.</td>
<td>147</td>
<td>63.6</td>
</tr>
<tr>
<td>Cryptosporidium sp.</td>
<td>43</td>
<td>18.6</td>
</tr>
<tr>
<td>Toxocara vitulorum</td>
<td>41</td>
<td>17.7</td>
</tr>
<tr>
<td>Giardia sp.</td>
<td>34</td>
<td>14.7</td>
</tr>
<tr>
<td>Isospora sp.</td>
<td>37</td>
<td>16.0</td>
</tr>
<tr>
<td>Buxtonella sulcata</td>
<td>22</td>
<td>9.5</td>
</tr>
<tr>
<td>Entamoeba sp.</td>
<td>15</td>
<td>6.4</td>
</tr>
</tbody>
</table>

Discussion

Cryptosporidiosis and giardiosis are zoonotic infections which can be transmitted to humans from infected cattle, sheep, cats and dogs. Zoonotic pathogenic species of Giardia and Cryptosporidium found in cattle can infect humans by contact with cattle and their faeces and via drinking water contaminated with cattle faeces (27, 28).

Giardiosis is a major cause of diarrhoea in calves. Humans can be reservoir for domestic ruminants and domestic ruminants can also be reservoir for humans, thus, giardiosis can be classified a zoonanthropic disease (14, 24).

In this study the prevalence of Giardia sp. reached 14.7% in diarrhoea calves. In another study done in Turkey, Değerli et al. (9) found the highest Giardia prevalence in 45-90 d aged calves and they reported that 14% of the calves in this age group were infected with Giardia sp. Iburg et al. (20), reported the prevalence of Giardia sp. in 10.4% of domestic ruminants and that infection rates were higher in young animals than in adults. Giardiosis was diagnosed in 26.6% of 815 calves in Sweden and in 45.7% of 505 calves in Canada (29, 31).

Xiao and Herd (34) found Cryptosporidium oocysts and Giardia cysts as early as in 14 d aged calves in their study done on 0-20 week-old calves. In our study Cryptosporidium oocysts were found in 17 d old and Giardia cysts in 16 d old calves.

Coccidiosis is a parasitic disease caused in young calves by more pathogenic coccidia such as E. zurnii and E. bovis. The most typical symptom of the disease is severe diarrhoea. Depending on species causing infection and severity of infection, bloody diarrhoea and even death can be seen (33).

In this study, the prevalence of coccidiosis reached 63.6%. In some other studies done in various regions of Turkey different prevalence rates of the disease were found. Göz and Aydin (16) demonstrated 89.13% prevalence rate in 3-12 month old calves in Yüksekova-Hakkari, Değerli et al. (8) 86.4% in calves in Van, Aslan (2) 90.8% in cattle in Kars, Dumanli et al. (10) 59.5% in 1-6 month old calves in Elaziğ, and Güleğen (17) demonstrated 69.8% prevalence in 0-6 month old calves and 54.4% in 6-12 month aged calves in Bursa. Our results have great similarity to those of Güleğen (17) and Dumanli et al. (10) who had similar study groups.

Although Eimeria oocysts were detected in 147 calves, bloody diarrhoea was detected only in 28 calves. It seems that in this case Eimeria was the primary etiologic agent in 28 calves with bloody diarrhoea.

Cryptosporidium sp. can also be a diarrhoeic agent in neonatal and young calves. In this study, the prevalence of Cryptosporidium sp. was detected in 18.6% of the animals. In the studies done to find the prevalence of Cryptosporidium in cattle, 25.7% of 140 calves with diarrhoea in Kars (4), 4.5% of 200 cattle in Zara-Sivas (25), 26.7% of 56 calves in Karacakabey-Bursa (6), 63.3% of 172 weaned calves with diarrhoea and
69.2% of 130 weaned calves without diarrhoea in Ankara (12) were found to have Cryptosporidium oocysts.

In the studies done in countries bordering with the east Turkey such as Iran and Iraq, 9 (9.5%) of 100 apparently healthy calves in Iran (26) and 12 (20%) of 60 cattle in Iraq (23) were found to be infected with Cryptosporidium sp. oocysts.

Some researchers reported that Buxtonella sulcata can cause diarrhoea in calves (19, 32). In our study 22 (9.5%) of 231 calves had B. sulcata cysts. There is no comprehensive study about this parasite in Turkey. In a study done in Poland, Tomczuk et al. (32) found cysts of B. sulcata in 102 (87.9%) of 116 cattle and detected that diarrhoea was more common in calves having B. sulcata cysts, one may think that B. sulcata can be causative agents of diarrhoea, especially in ruminants which are infected with a great number of cysts (15, 32), but more comprehensive studies should be done to explain this topic.

From 231 calves with diarrhoea 43 (18.6%) had no parasites. The age of these calves was 1-15 d. Diarrhoea in these calves was probably caused by viral or bacterial agents which were not examined in this study.

In conclusion, because there are many etiologic factors of neonatal and young calf diarrhoea, parasitic infection should be considered together with viral and bacterial agents, especially in >15 d old calves.

References