

# Investigation of some microbial and protozoon factors with rapid test kits in neonatal diarrheas in calves in Kars province

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## ABSTRACT

**Objective:** The aim of this study is to investigate some microbial and protozoon agents with rapid test kits in neonatal diarrhoea in calves in Kars region.

**Material and method:** Feces samples were collected from 100 neonatal calves (0-28 days old) with diarrhoea, which were brought to the private veterinary clinics / polyclinics serving in the center of Kars, and these samples were analyzed for Escherichia coli, Rotavirus, Corona virus, Giardia spp, and Cryptosporidium spp. In order to detect the presence of these agents, a mixed Bovid 5 AG (Bionote, Republic of Korea) rapid test kit containing specific rotavirus, coronavirus, E.coli, cryptosporidium, giardiaagents was used.

**Results:** The prevalence of Escherichia coli, Rotavirus, Corona Virus, Giardia spp, and Cryptosporidium spp were respectively were observed in 15 (15%), 14 (14%), 29 (29%), 12 (12%) and 4 (4%). The frequency of mixed infections was determined at a rate of 26%. The composition of these mixed infections as formed as E.coli+corona virus (5%); E.coli + rotavirus (4%); E.coli + cryptosporidium (2%); rotavirus + corona virus (6%); rota virus + cryptosporidium (3%); corona virus + cryptosporidium + giardia (2%); E.coli + cryptosporidium + giardia; rotavirus + coronavirus + cryptosporidium (1%) and rotavirus + cryptosporidium + giardia (1%).

**Conclusion:** When the results are evaluated in general; E.coli was the most common infectious agent obtained with rapid diagnostic kits in neonatal calf diarrhoea, followed by rotavirus, corona virus and mixed infections. It was concluded that in the treatment of neonatal diarrhoea and preventive medicine services in the Kars province which causes significant losses in terms of the country's

## INTRODUCTION

Newborn calf diarrhea is one of the most important diseases in cattle breeding in the world and in our country. Newborn calf diarrhea as bovine rotavirus (BRV), bovine corona virus (BCoV), bovine viral diarrhea virus (BVDV), Salmonella spp. (Salmonella), Escheria coli (E. coli) K99+, Clostridium perfringens (C. perfringens) type C and Cryptosporidium parvum (C. parvum) as well as environmental conditions, care- nutrition deficiencies and non-development of passive immunity are predisposing factors. These predisposing factors and infections etiologized by pathogenic agents cause remarkable economic losses due to growth retardation and high mortality.<sup>[1,2]</sup>

Disease-causing agents may cause neonatal calf diarrhea alone, or mixed infections may occur with the participation of more than one infectious agent.<sup>[3]</sup> The prevalence of infection by diarrhea-causing pathogens and the incidence of the disease differ according to herd management, region to region, and preventive medicine services.<sup>[4,5]</sup> The aim of this study was to reveal the causes and the prevalence of enteropathogenic agents in newborn calves with diarrhea complaints using ready-made test kits in Kars region.

## METHOD

Fecal samples collected from newborn calves (0-28 days old) brought to private veterinary clinics/policlinics serving in the center of Kars were studied. In clinical examination, feces samples were collected from calves whose diarrhea, weakness, anorexia, dehydration and cases requiring treatment were evaluated within the scope of neonatal diarrhea for more than 8-10 hours. Feces samples taken from the calves included in the study were tested for Escherichia coli, Rota Virus, Corona Virus, Giardia spp. and Cryptosporidium spp. by using the specific mixed Bovid 5 AG (Bionote®, Republic of Korea) rapid test kit.

A total of 100 calves within the scope of the study were performed on those who had diarrhea in the neonatal period and required treatment. Calves with diarrhea were evaluated as single and mixed infections detected from feces samples using rapid diagnosis kits.

## RESULTS

The etiology of infections were Rota virus (%15.0; n=15), Coronavirus (%13.0; n=13), E.coli (%29.0; n=29), Cryptosporidium Spp (%12.0; n=12), Giardia infections (%4.0; n=4). It was seen that the frequency of mixed infection was %26.0 (n=26). If the composition of mixed infection was evaluated most frequent mixed infection was Rota virus + Corona virus (%6.0; n=6). The frequencies of other mixed infections was summarized in table 1.

## DISCUSSION

Detection of pathogenic agents causing neonatal calf diarrhea in a short time using rapid diagnosis kits will contribute to the establishment of a treatment protocol. Treating with this diagnosis will prevent calf deaths and reduce economical losses.<sup>[6-10]</sup> Diagnosis of these enteropathogens is realised in more detail in laboratories that require equipment, but the use of rapid diagnosis kits provides benefits in practical diagnosis. With the etiological diagnosis, the disease-specific treatment and prognosis evaluation can prevent calf deaths and unnecessary drug use in therapy. In this way, diagnosis of enteropathogens in feces with ready-made diagnostic kits immune- chromatographically provides advantages compared to other diagnostic methods, providing fast results, cheap, simple and easy applicability, and determination of the treatment protocol in a short time.<sup>[8,9,11,12]</sup>

In our study, only five infectious agents requiring treatment in the Kars region were investigated. In our study, it was studied on calves diagnosed with ready-made diagnostic kits, and as a result of the analysis of feces samples of a total of 100 neonatal calves with diarrhea; 15% only rotavirus, 14% only coronavirus, 29% only E.coli, 12% only cryptosporidium, 4% only giardia agents were detected. Mixed infection was found in 26%. These microbial agents that come together and cause infection, 5% E.coli with coronavirus, 4% E.coli with rotavirus, 2% E.coli with cryptosporidium, 6% rotavirus with coronavirus, 3% rotavirus with cryptosporidium, 2% coronavirus with cryptosporidium with giardia. , 1% E.coli, cryptosporidium and giardia, 1% rotavirus, corona

**Table 1: Frequencies and percentages of enteropathogens detected in feces using rapid diagnostic kits.**

Patogens	(n=100)	(%)
Rotavirus	15	15
Coronavirus	14	14
E.coli	29	29
Cryptosporidium	12	12
Giardia	4	4
E.coli+Coronavirus	5	5
E.coli+Rotavirus	4	4
E.coli+Cryptosporidium	2	2
Rotavirus+Coronavirus	6	6
Rotavirus+Cryprosporidium	3	3
Coronavirus+Cryprosporidium	2	2
E.coli+Giardia+Cryprosporidium	1	1
Rotavirus+Coronavirus+Cryprosporidium	1	1
Rotavirus+Giardia+Cryprosporidium	2	2

virus and and cryptosporidium, 2% Rotavirus, cryptosporidium and giardia. In the neonatal period, E.coli infection causes osmotic diarrhea in calves, especially on days 1-7. [13] In the studies carried out; Al et al., determined the frequency of E Coli K99 as 17% and Ok et al %13.4 in calves with diarrhea by ELISA. [8,14] Moreover Kaya et and Coşkun (2018) found E Coli K99 frequency as 7.4% in Tokat and Aydın et al. found 69.3% in Kars in 2001. [15,16] We think that the reason why the results of our study differ from those of these studies may be due to the fact that only E.coli K 99 strain was examined and the differences in herd management.

Rota viruses generally cause diarrhea in calves 1-19 days old. [12] The variability of newborns' gastrointestinal pH levels, feeding with milk, and intestinal infections create an ideal environment for rota viruses. [17,18] Per acute diarrhea occurs after an incubation period of 12-24 hours after ingestion of the agent from the contaminated environment. [19] The virus causes maldigestive and/or

malabsorbative diarrhea due to atrophy in the villous cells of the epithelial cells of the small intestines. [4,15,19,20] Eskiizmirliler et al. found rota virus frequency as 25.9 % and Al et al found as 30.0%. [8,21] More over Alkan determined the frequency as 53% and Kaya et al. determined the presence of rotavirus as 44.8%. [15,22] Rota virus was detected in 26.9% of calves with diarrhea in Kars province. [11] In the present study, 15% of rota viruses were detected as the sole factor and 16% in mixed infections, and we think that the difference between this result and other previous studies is due to the regional, farm management and administration.

In the neonatal period, Corona virus can cause diarrhea in 5-30 days. Corona viruses that settle in the large intestine cause a decrease in water resorption by transforming the epithelium in the cubic structure into squamous epithelium. Corona

virus infections also cause loss of appetite, fatigue, persistent yellow diarrhea, severe dehydration and circulatory failure in calves. In the studies carried out; the different frequency of corona virus was determined. Alkan et al determined the frequency as 18%, Al et al. determined as 13%, Altuğ et al. determined as 1.9% and Erdoğan et determined as 1% in calves with diarrhea. [8,9,11,22] Kaya et al. determined the presence of 9.3% of corona virus infection as a mixed infection. [15] In this study, corona virus as a single infection factor was found in 14% and a mixed infection was found in 14%. The presence of corona virus in this study is among the rates found in previous studies. We believe that the difference with the study conducted in Kars is due to the study material and method.

Cryptosporidiosis is a precursor in neonatal calves with low mortality, although the morbidity is high, with a foul-smelling, white-yellowish color or bloody-comfortable diarrhea. As it is known, it can be more severe and lethal in mixed infections [8,15] In different studies it was found between 5.9%- 30.3%. [15,16,2,24] Gündüz et al. determined mAF staining (modified acid resistant) frequency as 5.5% and 7.5% with ELISA in calves with diarrhea. [25] In the current study, it was determined that the frequency of single pathogen was 12% and 10% in mixed infections. When the results are compared, we think that the difference between the values is due to the material and method of the studies.

Giardiasis is a disease that causes weight loss, progresses with chronic diarrhea and can be transmitted through feed and water contaminated with giardia cysts. Giardiasis can be found in the small intestines of calves 12 days to 12 weeks old. The feces of calves with giardiasis were generally yellow-green in color and watery-mucus. Göz et al. found the prevalence of giardia as 14.7% in diarrhea cases of neonatal calves, while the presence of giardia was found to be 4% in this study. [26]

Reducing calf deaths caused by diarrhea in the neonatal period is very important for sustainable livestock production. In this case, it is suggested that rapid detection of etiological factors contributes to the treatment. [9,27]

## CONCLUSION

In conclusion, it was determined that mixed infections with rotavirus and coronavirus played an important role in neonatal calf diarrhea in Kars region, with E.coli being the most common infectious agents examined with rapid diagnosis kits. It has been concluded that this should be taken into account in the treatment of diarrheal calves and preventive medicine services in the Kars Province.

## Disclosures

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** The authors have no conflicts of interest to declare.

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**Ethics Committee Approval:** The research was approved by the Kafkas Üniversitesi Hayvan Deneyleleri Yerel Etik Kurulu (KAÜ-HADYEK) Ethics Committee (Approval date: 23.09.2021, and Approval number: KAÜ-HADYEK/2021-137).

**Authorship Contributions:** Concept-OO, SK, HA, SH; Design - OO, SK, HA, SH; Materials - OO, SK, HA, SH; Data collection and/or processing - OO, SK, HA, SH; Analysis and/or interpretation OO, SK, HA, SH; Writing - OO, SK, HA, SH; Critical review - OO, SK, HA, SH.

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