



RESEARCH ARTICLE

Serological and virological investigation of Bovine Viral Diarrhea Virus infection in cattle with abortion problem

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Özet

Bulut O, Avcı O, Yapıcı O, Yavru S, Simsek A. Abort problemlili sığırlarda Bovine Viral Diarrhea Virus enfeksiyonunun serolojik ve virolojik araştırılması. **Eurasian J Vet Sci, 2013, 29, 3, 159-162**

Amaç: Bu çalışma Konya'da abort problemlili bir sığırcılık işletmesinde Bovine Viral Diarrhea Virus (BVDV) enfeksiyonunun varlığının belirlenmesi amacı ile yapıldı.

Gereç ve Yöntem: İnfertilite ve abort problemi görülen 228 sığırdan kan serumu ve lökosit örnekleri toplanarak BVDV antijen ve BVDV'ye karşı gelişen antikorlar yönünden Enzyme Linked Immunosorbent Assay ile incelendi.

Bulgular: Araştırmada 41 (%17.9) serum örneği seropozitif, 4 (%1.7) lökosit örneği BVDV antijen pozitif olarak belirlendi. BVDV antijen pozitif bulunan 4 sığırın 2 (%0.8)'si seropozitif 2 (%0.8)'si ise seronegatif tespit edildi. Antijen pozitif/antikor negatif hayvanlar 2 hafta sonra tekrar örneklenildi. Seronegatif sığırlar için aynı sonuçlar elde edildi. Persiste enfekte oldukları belirlenen bu hayvanlar kesime gönderildi.

Öneri: İşletmelere alınacak olan hayvanların kontrol edilerek hem BVDV antijen hem de antikor negatif olanların dahil edilmesi gerekmektedir.

Anahtar kelimeler: Abort, BVDV, ELISA, sığır

Abstract

Bulut O, Avcı O, Yapıcı O, Yavru S, Simsek A. Serological and virological investigation of Bovine Viral Diarrhea Virus infection in cattle with abortion problem. **Eurasian J Vet Sci, 2013, 29, 3, 159-162**

Aim: The aim of this study is to determine the presence of Bovine Viral Diarrhea Virus (BVDV) infection in a cattle herd with abortion problem in Konya.

Materials and Methods: Totally 228 blood serum and 228 leukocytes taken from cattle selected according to criteria for infertile and abortion problems were examined for antigens and antibodies to BVDV by Enzyme Linked Immunosorbent Assay.

Results: In this research, 41 (17.9%) sera were found seropositive and 4 (1.7%) leukocytes were BVDV antigen positive. Of these 4 BVDV antigen positive cattle, a number of 2 (0.8%) were detected seropositive while 2 (0.8%) were seronegative. The animals being antigen positive and antibody negative were sampled second time after two weeks. The same results were detected for two seronegative cattle. The animals detecting persistent infection status were sent to slaughter.

Conclusion: It is recommended that the animals should be checked in terms of BVDV for being negative both antigen and antibody before accepting them to the herds.

Keywords: Abortion, BVDV, ELISA, cattle



Introduction

Bovine viral diarrhoea virus (BVDV) causes a disease, primarily in cattle, and can include respiratory and reproductive symptoms, abortions, mummification, congenital anomalies, still-births, and birth of persistently infected (PI) carrier animals, and can lead to fatal mucosal disease (Baker 1995). It is a common infection among cattle all over the world (Zemke et al 2010). Infection is characterized with depression, diarrhoea and temporary leucopenia (Peterhans and Schweizer 2010). BVDV is a *Pestivirus* in the Flaviviridae family and is closely related to Classical Swine Fever and ovine Border Disease Viruses that cause BVDV in mammals (Safarpour Dehkordi 2011). BVDV strains are divided into cytopathic (cp) and noncytopathic (ncp) biotypes (Saliki et al 2000). Most *Pestivirus* isolates from cattle are classified as BVDV-1, showing a high genetic diversity (Hornberg et al 2009). Transmission can also occur through blood feeding flies (Tarry et al 1991). PI cattle are the main reservoir of BVDV within and between herds (Corbett et al 2011). PI cattle show specific immunological tolerance to the carrier virus and maybe born apparently healthy (Brinkhof et al 1996). Virus is excreted from acutely infected animals and for only a few days during the acute infection (Houe 1999).

The aim of this study is to determine the presence of BVDV infection in a cattle herd with abortion problem in Konya.

Material and Methods

Totally 228 cattle (unvaccinated for BVDV, >3 years) blood samples were taken into normal tubes to obtain serum and into tubes with EDTA to determine BVDV antigens. Blood samples which were taken into normal tubes were centrifuged 2000 rpm for 15 min. The serum samples were obtained kept in deep freezer under -25 °C. Serum samples were inactivated in 30 min at 56 °C before used. Leukocyte samples were prepared from blood samples taken into tubes with EDTA by a standard method. The leukocyte samples were kept in deep freezer under -25 °C until used. In order to separate animals with acute infection from those with persistent infection among cattle detected to have viral antigen, blood sampling was repeated for a second time, 15 days later.

All 228 blood serum samples were screened for antibodies to BVDV and leukocyte samples were tested for BVDV antigens using ELISA methods. Commercial direct and indirect ELISA kits (Institut Pourquier, France) were used for detection BVDV antigens and antibodies against BVDV. The test was performed as per the manufacturer's instructions. The plates were then read on an automatic plate reader at 450 nm. The results are expressed as an inhibition percentage, calculated in equation.

Results

228 samples taken from cattle selected according to criteria for infertile and abortion problems were examined for antigens and antibodies to BVDV by ELISA (Table 1). Forty one (17.9%) serum were found seropositive and 4 (1.7%) leukocytes were BVDV antigen positive. Of these 4 BVDV antigen positive cattle, a number of 2 (0.8%) were detected seropositive while 2 (0.8%) were seronegative. The animals being antigen positive and antibody negative were sampled second time after two weeks for detecting the infection status (transient viremic or persistent infection) and two of them were identified BVDV positive. The animals detecting persistent infection status were suggested to slaughter.

Table 1. BVDV antibody and antigen position of cattle.

BVDV	Antibody		Total
	+	-	
Antigen +	2	2	4
Antigen -	39	185	224
Total	41	187	228

Discussion

Bovine Viral Diarrhoea Virus is a common disease in cattle populations in the world. BVDV may result in reproductive and respiratory disorders. It is a very important disease financially to the cattle industry (Handel et al 2011). BVDV infection results in an acute, subclinical and transient disease in bovine populations (Justewicz et al 1987). Serological diagnosis is very important for the detection of BVDV, an important pathogen related to reproductive failure. Among different serological assays that have been used for BVD over the years, the most commonly used antibody detection techniques are the virus neutralization test (VNT) and ELISAs. VNT is a labor-intensive and also expensive test (Sandvik 2005). As an alternative to the VNT, indirect and blocking ELISAs are commonly used. ELISAs have many advantages over the VNT for BVDV (Howard et al 1985, Brinkhof et al 1996, Xia et al 2011). Researchers estimated that ELISA-BVDV is good sensitivity, specificity and repeatability method for detecting antibodies against BVDV and it is easy to transfer, economical, and easy to perform (Pacheco and Lager 2003, Cornish et al 2005, Safarpour Dehkordi 2011). Simsek and Ozturk (1997) reported 2 acute persistent infections by BVDV in 142 healthy cows by monitoring the leukocyte samples with direct immunofluorescence test (DIFT). Yapkic et al (2006a) tested 143 bull's blood samples taken from chosen bulls that using in artificial insemination centers for antibodies against BVDV by ELISA/Ab. It was determined as positive 25 bulls (17.48%) for BVDV. Besides, all seronegative bulls were also detected as antigen negative by ELISA/Ag. Yapkic et al (2006b) examined 128 blood samples





for antigens and antibodies against BVDV by ELISA. 36 out of 64 (56.25%) cattle sera were detected as seropositive while only one (1.56%) serum from a foetus was detected as seropositive.

In this study, we showed the prevalence of BVDV (Table 1) infection among cattle with the history of abortion in a herd of Konya. In the present study, 4 out of 228 cattle were detected BVDV antigen positive while 224 out of 228 cattle were negative. Two out of 4 cattle which antigen positive were also determined for antibodies against BVDV. It has largely been assumed to be due to infection with heterologous BVDV isolates (Collins et al 1999). On the other hand, 2 of 4 antigen positive cattle were not detected as negative for BVDV antibodies. When seronegative cattle are infected with an ncp BVDV biotype, virus can be transferred easily into the foetus and infection in early period of gestation may produce PI calf. These animals show immunological tolerance to the carrier virus and maybe born apparently healthy (Brinkhof et al 1996).

Conclusions

It could be considered that both antigen and antibody positive animals might be sampled in acute phase of disease while antibody negative and antigen positive animals may be infected by in utero way during dam pregnancy. 39 antibody positive and antigen negative animals could be infected by BVDV in any time of their lifespan. In conclusion, 2 out 41 cattle's dams were infected with ncp BVDV for the first time during the early period of pregnancy and they were detected antigen positive and antibody negative. It was interesting that the other cattle detected antigen positive and antibody positive. It was also infected by intrauterine in early period of gestation and it was detected antigen positive, but it was detected antibody positive. Maybe this cattle was infected another ncp biotype of BVDV during a point of its lifespan and formed antibodies against BVDV. These findings presented here demonstrated one mode of prevalence of BVDV infection in a cattle herd with abortion problem. Then, especially taking in the consideration of the economic losses of the herd, starting the control program of BVDV infection is recommended.

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