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Original Article

Comparative Prevalence of Bovine Viral Diarrhea Virus Antibodies among Native and Imported Cattle in North of Sistan and Baluchistan-Iran

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Abstract

Background and Aims: Sistan is a major pole in dairy production and genetic resource for the unique sistanian breed in the southeast of Iran. This region has a wide border with Afghanistan and cattle imports are done through this border. The main aim of this study was to compare the seroprevalence of Bovine Viral Diarrhea Virus (BVDV) infection rate using direct Enzyme-linked immunosorbent assay (ELISA) test among imported and native cattle's.

Materials and Methods: Totally, 180 serum samples were collected from 20 non-vaccinating farms in the north of Sistan and Baluchistan province –Iran. Commercial indirect ELISA test was used for detection of serum antibodies against BVDV. Statistical analysis was performed using Chi-square test.

Results: The numbers of 123 (68.33%) cows were seropositive. All of the herds were were ELISA seropositive. The seroprevalence ranged from 73 to 100 percent within the farms. The prevalence was significantly higher in cows higher than 2 years old compared to animals less than 2 years old ($P<0.05$).The results revealed no significant differences in seroprevalence of BVDV between native Iranian and imported cattle in Sistan. Sex of animal had no influence on the prevalence of BVDV.

Conclusions: Results of this study indicated that BVDV was highly prevalent in the north of Sistan and Baluchistan and BVDV infection could be controlled by livestock – trade control, and considering biosecurity measures in the farms.

Keywords: BVDV, ELISA, cattle, Sistan and Baluchistan, Iran

Introduction*

Bovine Viral Diarrhea (BVD) is highly contagious viral diseases of cattle, exhibit a worldwide distribution.

BVDV exists in two biotypes, cytopathic (CP) and noncytopathic (NCP) depending on their effect on cell culture. The NCP Biotype is more frequent in nature and accounts for most of the echonomical damags.

Noncytopathic crosses through the placenta to establish a persistent infection (PI).If the fetus is infected and survives after birth, BVD virus can severely affect the reproductive and nervous system [13]. Successful BVDV eradication is reliant on the use of 'test and cull' protocols involving

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removal of persistently infected (PI) cattle from all farms.

The measurement of serum antibody responses of cows exposed to BVDV is still a standard procedure for eradication and manegment of BVD. Enzyme-linked immune sorbent assays (ELISAs) are the most frequently used tests for BVDV screening [12].

ELISA is an affordable yet valuable diagnostic method for mass screening programs which can be used to detect immunoreactive molecules. These methods are independent from cell culture, and can easily be applied in most labratoreies. Furthermore,the obtained results can be prepared in a few hours [5]. The present work was aimed to evaluate the seroprevalence of BVDV among imported and native cattle herds in Sistan-Iran, and to estimate the possible influence of breed and different age groups on BVDV prevalence in this province.

Methods

Sampling. Sistan is a major center for livestock and dairy production in the southeast of Iran. This region has a dry tropical climate that about 95% of the cows in this province are located in this region. Most of the dairy farms in Sistan are small with traditional animal husbandry system. The herd density was about 5–20 cattles per farm and milk production was ranged between 8 to 15 Kg/day. In each herd, animals were randomly selected for sampling. The population of herds that included in this study was 5 to 30 heads with no BVDV vaccination program.

In this study total, 180 blood samples were obtained from 20 dairy cattle herds in the north of Sistan and Baluchistan province -Iran. A questionnaire containing information about the kind of animals as native or imported, gender and breed were completed for every cattle.

Eighty one blood samples were collected from Iranian Sistani cattle (Bos indicus) and 29 blood samples from different Holstein and crossbred cattle herds in Sistan area-Iran. Also, 70 samples were collected from imported cattle from Afghanistan in Zabol slaughterhouse.

Blood samples were collected from young (< 2 years old) and older (≥ 2 years old) cows on each herd.

Samples were collected between January and June 2013.Blood sampels were transferred on ice bag to clinical pathology labratory of Faculty of Veterinary Medicine, University of Zabol-Iran. Samples centrifuged (3000 rpm for 10 min) to obtaine serum. The collected serum stored at −80 ◦ C until analysis

Serum testing. Serum BVDV antobodies were assayed using a commercial indirect ELISA-kit (IDEXXBVDV AB, Switzerland, Liebefeld- Bern) in which microplates were coated with BVDV antigen. The sensitivity (Se) and specificity (Sp) of the test as manufacturer data were reported to be 95% and 98%, respectively. Serum samples were tested by ELISA according to the manufacturer's instructions and also the method described by Lanyon et al, 2013 [8].

Statistical analysis. The Rogan and Gladen's correction of apparent prevalence were used for estimation of the true prevalence. Statistical analysis were performed using Chi-square. Statistical significance was set at $P < 0.05$.

Results

The seroprevalence of BVDV in imported Afghani cattle wasn't significantly higher than Sistani and Holstein cattle herds. The prevalence of BVDV antibody among the imported and native cattle herds is presented in Table1. It was demonstrated that 123 (68.33%) out of 180 serum samples were BVDV seropositive (Table 1). All of the herds had antibody against BVDV. However, the true prevalence ranged from 73 to 100% within the herds. In the present study, the number of seropositive animals signifficantly increased with the age. The infection rate in animals <2 and ≥2 years old were 48.78% and 74.1%, respectively (Table 2). Distribution of BVDV antibody within the different age groups showed the percentage of seropositive animals was higer than two years old which were significantly higher from the animals less than

Table1: The seroprevalence of BVDV according to breed of herds and tested cows in some dairy cattle herds in north of Sistan and Baluchestan: Iran

Breeds	No. of animals	BVDV Ab. Positive	
		No. of positive animals	Prevalence
Holstein	29	18	**%62. 6**
Sistani(Bos indicus)	81	54	**%66.0**
Imported(Afghani)	70	51	**%72.85**

Table2: Distribution of BVDV antibody within the different age groups in some cattle herds .in north of Sistan and Baluchestan: Iran

Age (Year)	BVDV		Total
	+(%)	---(%)	
<2	20 (48.78)	21(51.21)	41
≥2	103 (74.1)	36(28.59)	139
Total	123 (68.33)	57 (31.66)	180

*Significant differences (P<0.05).

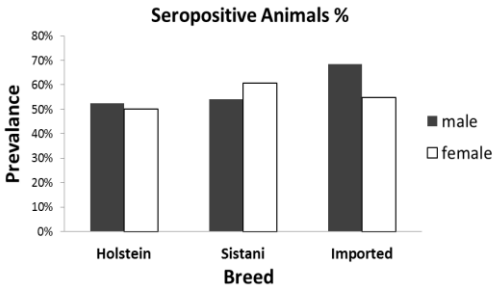

Fig.1. Prevalence of anti- Bovine Viral Diarrhea Virus antibodies in castles by sex

two years old. (P<0.05)(Table 2). When comparing the positivity between males and females, no significant difference was found (figure 1).

Discussion

The design of disease control programs should be built upon local information. The current study aimed to determine levels of exposure to BVDV in the Sistani and imported Afghani breed cattle population.

According to the results, the true prevalence (74.35%) of BVDV seropositive cattles did not make signifficant difference with observed prevalence (68.33%). Since, vaccination program against BVDV was not performed in Sistan and Baluchistan-Iran; therefore, percence of seropositive animals reflected natural infection. The evaluation of the effects of breed on BVDV seropositivity revealed that there were no significant differences among the Iranian native Sistani breed, Holstein and imported Afghani breed. (Table1). However,

the prevalence rate was significantly higher in older age group (Table 2).

Previous works based on the antibodies detection have shown that the prevalence of infected herds ranged between 68% to 100% [11, 2, and 10]. Our results revealed that the prevalence of antibodies to BVDV in Sistan and Baluchistan province does not differ from the other other provinces of Iran. Previous studies demonestrated that the herds with high population had higher rate of infection than the smaller herds [4] so our finding was not in agreement with results obtained by other studies [6].

It could be due to the herd size and traditional dairy herds management in Sistan and Baluchistan province: Iran. Another explantation is the lower density of cow population in cattle herds of Sistan-Iran and illegal transportation of cattle from afghanistan.

We also compared prevalence of seropositive animals in different age groups. Our obtained data showed the tendency to higher risk among older (≥ 2 years old) animals compared to younger (aged < 2 years) cattles (Table 2). similar data found in cattle in suburb of Mashhad- Iran, using the commercial indirect ELISA kit [14]. In another study performed in Danish dairy herds by Houe and Meylingin 1991, seropositivity in animals older than 4 years was lower and the younger cattles (aged1–4years) were subject to higher risk of infection [6].Results of the present study prominantly difference with data obtained in Danish dairy herds. Another studies mentioned that the risk of BVDV infection were nearly similar in different age groups [4]. The incomparability could be due to keeping condition, herd population, vaccination program and eradication strategies.

By considering the fact that BVDV antibodies remains lifelong. So with increasing the age, the probability that it has been infected during its life increased. Persence of persistently infected (PI) animals can increase the risk of infecttion. It was reported that prevalence of seropositive cows in farms with one or more persistently infected cattles was 87%; however, it was 43% in farms with no PI animals [11]. Results of one study using reverse transcriptase-polymerase chain reaction (RT-PCR) technique showed that bulk milk tanks of dairy herds in Khorasan- Razavi province of Iran was infected by BVDV [15]. Our data clearly indicate that that BVDV infection present widely innative and imported cattle herds in north of Sistan and Baluchistan province

Therfore, it is likely to be PI animals (s) within the investigated farms. Furthermore, these herds possoibly had a recent or an ongoing infection due to the presence of persistantly infected animals [1]. In the present work, there were no statistically significant differences between males and females (figure 1). With respect to the present results, it is concluded that the presence of persistently infection animal(s) within the imported and native cattle herds in Sistan and Baluchistan provinces of Iran is the main reason for the seroinfection. More studies should be carried out to dtermine epidemiological aspects of BVDV in Zabol district as an important pole of dairy production in North of Sistan and Baluchistan.

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