Available online at www.scholarsresearchlibrary.com

Scholars Research Library

Scholars Research Library

Annals of Biological Research, 2013, 4 (5):88-91
(http://scholarsresearchlibrary.com/archive.html)

Annals of Biological Research
Scholars Research Library
ISSN 0976-1233
CODEN (USA): ABRNBW

Comparison of bovine viral diarrhea virus infection between sarabian and holstein dairy cows in relation to abortion

AmirParviz Rezaeisaber[1], Hossein Nikniaz[2] and Arash Davatgar Badie[2*]

[1]Department of Clinical Science, Tabriz Branch, Islamic Azad University, Tabriz, Iran
[2]Young Researchers and Elite Club, Tabriz Branch, Islamic Azad University, Tabriz, Iran

---

ABSTRACT

Bovine Viral diarrhea (BVD) is an important viral disease in cows all over the world. This virus is one of the flaviviridae family viruses and pestivirus species which causes several syndromes. BVD virus (BVDV) Is recognized as important causes of bovine abortion and congenital disease worldwide. In this study, serological investigations were performed using the ELISA method on 176 serum samples to estimate the prevalence of BVDV infection in Sarabian & Holstein dairy cows, to assess to what extent it may affect abortion rates in two herds. The overall BVDV seroprevalence in Sarabian dairy cows was estimated at 30% (25/84), and in Holstein, seroprevalence was 52% (48/92). There was a statistically significant (P = 0.04) association between presence of antibodies to BVDV in two herds. Among aborting cows from herds, Sarabian herd 37% (11/30) had antibodies and Holstein herd 44% (20/45) had antibodies to BVDV. Therefore, we did not find a significant association between percentage of abortion in seropositive Sarabian and Holstein dairy cows (p = 0.176). The results confirmed that although Sarabian breed is more resistant to BVDV than Holstein, number of seropositive aborted cows were approximately similar in two herds.

Keywords: BVDV, Sarabian, Holstein, Dairy cow, ELISA, Abortion, East Azerbaijan, Iran

---

INTRODUCTION

BVDV is a pestivirus that causes several diseases like Bovine Viral Diarrhea (BVD) and Mucosal Disease (MD) [18]. BVDV can produce a broad range of clinical signs, although infection can also manifest itself without any obvious symptoms [2, 5].

BVD viruses are divided to two biotypes: cytopathic (cp) and noncytopathic (ncp), as defined by the effect of viral growth in cultured cells. The ncp biotype can establish a persistent infection (PI) of the fetus if the placenta is transiently infected between approximately days 42 and 125 of its gestation [18]. According to the studies, it is shown that the mean prevalence of PI animals is estimated to be 1-2% in herds [17]. PI cattles can shed large quantities of BVDV throughout life [18].

As the virus is immunosuppressive, BVD can aggravate other diseases or make the animals more susceptible to other disease complexes such as bronchopneumonia, diarrhea and mastitis [14, 23].

Many pathogens considered when examining reproductive failure and for which serological tests are commonly available include BVDV, infectious bovine rhinotracheitis (IBR), *Neospora caninum* and *Mycobacterium paratuberculosis* (Johne's disease) [22, 25]. Moreover, Immunosuppressive events during gestation have been suggested and the role of immunosuppression by concurrent infection (such as BVDV and *N. caninum*) has been addressed [7]. Infections during early and late pregnancy with BVDV can result in embryonic death, abortions, birth of stillborn, fetal anomalies or weak calves [4, 11, 23].

Various diagnostic tests are available for aiding in the control and prevention of the BVDV and In our study Enzyme-linked immunosorbent assay (ELISA) was used to detect the presence of antibodies in samples. BVDV ELISAs are commercially available, rapid and cost effective and are useful in the identification of infectious animals [8, 13, 26].

In this study, serological investigations were performed using the ELISA method on 176 serum samples to estimate the prevalence of BVDV infection in Sarabian & Holstein dairy cows, to assess to what extent it may affect abortion rates in two herds.

MATERIALS AND METHODS

Study Herds

The present study was conducted between June and July 2011 in two dairy herds [Sarabian (one of the indigenous breeds of Iranian dairy cows in the East Azerbaijan province) & Holstein] in the East Azerbaijan province, Iran, for estimation of the prevalence of BVDV in those herds and to assess the association between abortions and current BVDV infections.

The herds were not vaccinated against BVDV previously. It must be note that all animals haven't any history of mucosal diseases.

In herds Pregnancy checks were performed by rectal palpation by the responsible experts (veterinarians) in day 45 post-insemination with follow-up examinations day 120 and day 210.

It was known if the animals had abortions in previous pregnancies and the farm veterinarians had maintained records of them for every cow in herds and provided these records to us when requested.

Definitions

The herds had histories of abortions between days 45 and days 120 of their previous pregnancies. Thus, this study abortions were defined as any foetal loss after pregnancy confirmation between day 45 and day 120 in gestation had occurred: (i) if abortion of cows was observed, (ii) after confirmation of pregnancy, the cows that were observed in oestrus and during pregnancy check, they were diagnosed non-pregnant or (iii) if a cow was found non-pregnant on a next pregnancy examination. Abortion time was estimated as the time when foetal loss was confirmed.

Sampling and laboratory methods

In this study, about 176 dairy cows (84 Sarabian & 92 Holstein) complete blood samples from apparently healthy cows were randomly collected. The samples were collected from adult cows (16 month <). These specimens were sent to laboratory immediately and samples were centrifuged at 1500 round per minute for 15 minutes and buffy coat achieved. In this term tried to prevention from assimilation of buffy coat with RBCs. Serum samples were frozen to complementary experiments. In lab, sera samples were used to detection of antibody against BVDV by special kits produced by PRIONCS and through ELISA method.

Statistical analysis

The data were analyzed with Statistical Package for Social Sciences software (SPSS, Version 11.0). Parameters were expressed as percent and number. Significant differences between two herds were calculated by chi-square. The P-values of less than 0.05 were considered statistically significant.

Results and Discussion

In the recent study, 48 (52%) of the 92 sera of Holstein and 25 (30%) of the 84 sera of Sarabian were positive to BVDV antibody (table1). There was a statistically significant (P = 0.04) association between prevalence of BVDV antibodies in Holstein and Sarabian breeds.

45 (49%) of 92 cows in Holstein herd and 30 (%36) of 84 cows of Sarabian herd had abortion problem (table2), So There was no significant differences between two herds (p = 0.094).

Of 45 animals that had abortion problems in Holstein herds, 20 (44%) cows were infected to BVD virus, on the other hand, in Sarabian herd of 30 aborted animal 11(37%) cows were infected (table3). There wasn't a statistically significant (P = 0.176) association between prevalence of BVDV antibodies in aborted Holstein and Sarabian cows.

Table 1. The number of seropositive(Infected) and seronegative(non-infected) animals in Holstein & Sarabian herds

group	Infected		non-infected		Total		p-value
	n	%	N	%	n	%	
Holstein	48	52	44	48	92	100	0/04
Sarabian	25	30	59	70	84	100	

Table 2. The number of aborted and non-aborted animals in Holstein & Sarabian herds

group	aborted		non-aborted		Total		p-value
	n	%	N	%	n	%	
Holstein	45	49	47	51	92	100	0/094
Sarabian	30	36	54	64	84	100	

Table 3. The number of seropositive(sp) aborted and seronegative(sn) aborted animals in Holstein & Sarabian herds

group	(sp) aborted		(sn) aborted		Total		p-value
	n	%	n	%	n	%	
Holstein	20	44	25	56	45	100	0/176
Sarabian	11	37	19	63	30	100	

BVDV is endemic in most cattle-raising countries throughout the world, with 60–85% of adult animals being antibody positive [9]. In present study, the prevalence of BVDVpositive cows in Sarabian and Holstein herds were 30% and 52%. Many studies have been carried out in different countries aimed at evaluation of the prevalence of BVDV in dairy cows. [4] stated that the seroprevalence for BVDV was 32% and in other work, in 1988 55% of 4848 sampled Swedish dairy cows were antibody-positive for BVDV [4]. A study in Sweden in 1984 showed that 41% of 711 heifers sampled were seropositive to BVDV at the time of their first insemination [5]. In this study, there was a significant difference between seroprevalence of BVDV antibodies in Sarabian and Holstein dairy cows ($p = 0.04$) and Among two breeds, Sarabian cows had a lower seroprevalence of BVDV antibodies than Holstein cows. Many factors could be effecter on this seroprevalence difference. That may be due to the breed specifics. For example, the reported differences in the prevalence of mastitis between Holstein and Jersey cows may suggest the occurrence of breed-dependent differences in the immune response to infections [3].

We assume that another factor for this issue, could be amount of milk production. High levels of milk production can increase metabolic disorders such as plasma concentrations of none esterified fatty acid (NEFA) [19]. It is notable that mean of daily milk production in our Sarabian studied cows was 15 kg/cow and in Holstein cows was 27 kg/cow. [6] stated that the mean serum NEFA in Holstein breed was higher than Sarabian cows. Increased NEFA levels are temporally associated with immune function suppression and may contribute to disturbance of the immune system in dairy cows [21]. It is likely that metabolic disease in cow increases the susceptibility of the cow to development of infectious disease such as BVD. However, this is important that relationships between the amount of immune response and production traits of dairy cows are largely unknown [24].

BVDV infection at groups of susceptible cows around the time of insemination and during the embryonic early to mid-fetal period can result in conception failure, increased embryonic mortality, fetal mummification, abortion, premature births, stillbirths, congenital defects, the birth of stunted weak calves, and the birth of PI calves which subsequently may develop mucosal disease [18, 19].

Among aborting cows from herds, Holstein herd 44% (20/45) had antibodies and Sarabian herd 37% (11/30) had antibodies to BVDV. Therefore, In present study, there was not significant association between percentage of abortion in days 45 and 120 of development in seropositive Sarabian and Holstein dairy cows ($p = 0.176$). BVDV infection has been associated with epidemic and endemic bovine abortion in several studies. [4] collected 378 samples in herds with abortion problems and indicated that 42% of the animals had seral antibodies to BVDV. Another study confirms the presence of BVDV infection in Italian dairy herds with reproductive problems (such as abortion). In that study, Overall, 53.3% of samples were serologically positive [10].

Therefore, it is not unlikely that pathological effects in the placenta induced by BVDV may allow other pathogens to more easily cross the feto-maternal barrier [12]. [1] reported that there were concomitant *N. caninum* and BVDV infections in two out of 218 aborted bovine fetuses investigated. It is important that No autopsies were performed on any of the aborted fetuses, so there was no direct evidence that BVDV infection had caused the abortions in the our cows in two herds.

CONCLUSION

In conclusion, the results of present study showed that among two Sarabian and Holstein dairy cows, Sarabian cows had a lower seroprevalence of BVDV antibodies than Holstein cows. Therefore, Sarabian breed is more resistant to

BVDV than Holstein. It is notable that percentages of aborted animals in two herds were approximately similar but, in Holstein number of seropositive aborted cows were more greater than Sarabian cows.

REFERENCES

[1] J.S. AGERHOLM, C.M. WILLADSEN, T.K. NIELSEN, S.B. GIESE, E. HOLM, L. JENSEN and J.F. AGGER, *J. of Vet. Med*, **1997**, A 44, 551-558.

[2] J.C. Baker, *Vet. Clin. North. Am. Food Anim. Pract*, **1995**, 11, 425-445.

[3] D.D. Bannerman, A.C. Kauf, M.J. Paape, H.R. Springer and J.P. Goff, *J. Dairy Sci*, **2008**, 91 (6), 2225-2235.

[4] C. BJÖRKMAN, S. ALENIUS†, U. EMANUELSSON‡ and A. UGGLA§, *The Vet. J*, **2000**, 159, 201-206.

[5] J. Brownlie, M.C. Clark and C.J. Howard, *Vet Rec*, **1984**, 144, 535-536.

[6] Y. Davoudi and J. Mobaraki, *Ann. Of Bio. Res*, **2012**, 3(6), 2809-2812.

[7] J.P. Dubey, *J. Parasitol*, **2003**, 89, 42-56.

[8] D.A. Graham, I.E. McLaren and A. German, *The Vet. J*, **1998**, 156, 149-154.

[9] H. HOUE, *Vet. Microbiol*, **1999**, 64, 89-107.

[10] C. Luzzago, R. Piccinini, A. Zepponi and A. Zecconi, *Vet. Microbal*, **1999**, 64, 247-252.

[11] V. Moennig and B. Liess, *Vet. Clin. North Am. Food Anim. Pract*, **1995**, 11 (3), 477-487.

[12] R. D. MURRAY, *Archives of Virology*, **1991**, 3, 217-224.

[13] V. Palfi, H. Houe and J. Philipsen, *Acta Vet. Scand*, **1993**, 34, 105-107.

[14] l.N.D. POTGIETER, *Vet. Clin. North. Am. Food Anim. Pract*, **1995**, 11, 501-520.

[15] B.O.M. Radostits, C.C. Gay, K.W. Hinchcliff and P.D. Constable, VETERINARY MEDICINE A textbook of the diseases of cattle, horses, sheep, pigs and goats. 10rd Ed, (ELSEVIER; Edinburgh, London, New York, Oxford, Philadelphia, St Louis, Sydney, Toronto, **2007**) 1250.

[16] B.O.M. Radostits, C.C. Gay, K.W. Hinchcliff and P.D. Constable, VETERINARY MEDICINE A textbook of the diseases of cattle, horses, sheep, pigs and goats. 10rd Ed, (ELSEVIER; Edinburgh, London, New York, Oxford, Philadelphia, St Louis, Sydney, Toronto, **2007**) 1257.

[17] B.O.M. Radostits, C.C. Gay, K.W. Hinchcliff and P.D. Constable, VETERINARY MEDICINE A textbook of the diseases of cattle, horses, sheep, pigs and goats. 10rd Ed, (ELSEVIER; Edinburgh, London, New York, Oxford, Philadelphia, St Louis, Sydney, Toronto, **2007**) 1260.

[18] A. Rezaeisaber, A. Davatgar Badie and M. Nazeri, *Aust. J. of Basic. and Appl. Sci*, **2011**, 5(10), 696-699.

[19] A.P. RezaeiSaber, M. Nazeri and F. Hatefi, *ASI. J. EXP. BIOL. SCI*, **2012**, 3(1), 1-7.

[20] S.P. Rodning, M.S.D. Marley, Y. Zhang, A.B. Eason, C.L. Nunley, P.L. Walz, K.P. Riddell, P.K. Galik, B.W. Brodersen and M.D. Givens, *Therio. J*, **2010**, 73, 1154-1163.

[21] T. Rukkwamsuk, T.A. Kruip and T. Wensing, *Vet. Quarterly*, **1999**, 21, 71-77.

[22] M.W. Sanderson and D.P. Gnad, *Vet. Clin. North Am. Food Anim. Pract*, **2002**, 18, 79-98.

[23] K. Sta°hl, C. Bjo¨rkman, U. Emanuelson, H. Rivera, A. Zelada, and J. Moreno-Lo´pez, *Preve. Vet. Med*, **2006**, 75, 177-188.

[24] L.C. Wagter, B.A. Mallard, B.N. Wilkie, K.E. Leslie†, P.J. Boettcher‡ and J.C.M. Dekkers§, *J. Dairy Sci*, **2003**, 86,169-173.

[25] B. Yamini, T.P. Mullaney, J.S. Patterson, S.D. Fitzgerald, B.A. Steficek and F. Kennedy, *Bov. Pract*, **2004**, 38, 59-64.

[26] G.M. Zimmer, C. Van Maanen, I. De Goey, J. Brinkhof and G.H. Wentink, *Vet Microbiol*, **2004**, 100, 145-149.