

## Animal Review

2014 Vol. 1, No. 4, pp. 65-68

ISSN(e): 2409-6490

ISSN(p): 2412-3382

© 2014 Conscientia Beam. All Rights Reserved.

# IDENTIFICATION OF CATTLE PERSISTENTLY INFECTED WITH BVDV (PI) BY EAR-NOTCH TESTING IN SOUTHEAST OF IRAN

Ali Asghar Mozaffari<sup>1†</sup> --- Mohammad Khalili<sup>2</sup> --- Farzaneh Jahangosha<sup>3</sup>

<sup>1</sup>Department of Clinical Studies, School of Veterinary Medicine, Shahid Bahonar University of Kerman, Kerman, Iran

<sup>2</sup>Department of Pathobiology, School of Veterinary Medicine, Shahid Bahonar University of Kerman, Kerman, Iran

<sup>3</sup>Graduated, School of Veterinary Medicine, Shahid Bahonar University of Kerman, Kerman, Iran

## ABSTRACT

*Bovine viral diarrhoea virus (BVDV) infection can induce a variety of economically important clinical manifestations in cattle herds. One potential outcome is the creation of calves that are viremic but immunotolerant to the virus. These persistently infected (PI) calves are the result of in utero exposure to BVDV prior to the development of a competent fetal immune system. The aim of this study was to detect of cattle persistently infected with BVDV by ear-notch testing in southeast of Iran. Ear-notch skin samples, 3 mm in diameter, were collected from a total of 127 cattle from 6 randomly selected herds (calves aged under 12 months), using pliers usually used for ear tagging and skin notch sampling, as described by the manufacturer of the Herd check ELISA kit (IDEXX) for the detection of BVDV antigen in PI cattle. Overall, 0.78 per cent of the animals examined, were positive for BVDV antigen. This study identifies the cattle persistently infected with BVDV by ear-notch testing in southeast of Iran for the first time.*

**Keywords:** BVDV, PI, Cattle, Iran, Ear-notch.

## Contribution/ Originality

This study identifies the cattle persistently infected with BVDV by ear-notch testing in southeast of Iran for the first time.

## 1. INTRODUCTION

BVDV is one of the most economically important pathogens in the cattle industry nowadays [1-4]. Bovine viral diarrhoea virus (BVDV) infection can produce a variety of economically important clinical manifestations in cattle herds. One potential outcome is the creation of calves that are viremic but immunotolerant to the virus. These persistently infected (PI) calves are the result of in utero exposure to BVDV prior to the development of a competent fetal immune system [5]. The calves are persistently viremic and continue to shed the virus for the rest of their lives. The neonatal mortality of PI calves is high and some of them are born weak [6]. PI calves can present as stunted animals with an unthrifty coat, but not all PI animals are in poor condition

† Corresponding author

and it is not possible to diagnosis them from the physical appearance [7]. The real danger of PI calves lies in the fact that they are persistently viremic, immunosuppressed and constantly/intermittently shedding virus, and are the main source of infection for other animals [8, 9]. If PI calves can be detected, they can be removed in time to prevent spreading of virus to susceptible animals [10]. To the best of our knowledge, no report has been published on cattle persistently infected with BVDV in Iran. The aim of this study was to detect of cattle persistently infected with BVDV by ear-notch testing in southeast of Iran.

## 2. MATERIALS AND METHODS

Ear-notch skin samples, 3 mm in diameter, were collected from a total of 127 cattle (Iranian cross-breed) from 6 randomly selected herds (dairy cattle with different numbers) in Kerman province of Iran (calves aged under 12 months), using pliers usually used for ear tagging and skin notch sampling, as described by the manufacturer of the Herd Check ELISA kit (IDEXX) for the detection of BVDV antigen in PI cattle. The collected samples were covered with the soaking buffer provided in the ELISA kit, and were stored at  $-80^{\circ}\text{C}$  until required. The ELISA kit was then used on the collected ear-notch samples, according to the manufacturer's instructions. The IDEXX BVDV Ag/Serum plus Test is an enzyme-linked immunoassay for the detection of bovine viral diarrhoea virus antigen in serum, plasma, whole blood and ear-notch tissue samples. To confirm PI, the animals were tested two or three weeks after first sampling.

## 3. RESULTS

Table 1 shows the results for detection of BVDV antigen in the 127 ear-notch samples. Overall, 0.78 per cent of the animals examined were positive for BVDV antigen. The PI animal was not tested for antibodies anti-BVDV. The clinical condition of PI Animals was normal in other respect. The history of studied farms showed a number of reproductive/respiratory problems, abortion, etc.

## 4. DISCUSSION

Ag ELISA using ear-notch samples is an efficient technique for diagnosis of PI calves [11]. Ear-notch testing is respected by many researchers as the method of choice to detect PI animals in cattle herds, as the samples are easy to collect, sophisticated equipment is not required, the samples can be used in a number of BVDV detection systems and they are not affected by the presence of passive antibodies [3, 11-15].

Results of present study were accordant with records in the literature from other countries that indicated that up to 2 percent of cattle are PI with BVDV in most countries [3, 11, 15, 16].

The results of the this study indicate that there is BVDV activity in the farms under study, which necessitates a control policy to be implemented immediately [17, 18].

Firstly, all existing PI calves should be eliminated from the herd, and routine testing of cattle should be introduced to enable the early identification and removal of new PI animals [15].

Secondly, precolostral serum samples from apparently healthy neonatal calves could be tested to determine exposure to BVDV in utero from 150 days of gestation; at this gestational age the fetus will be able to produce antibodies to BVDV, which will protect it from the ill effects of the virus, and the antibodies will be detectable in serum samples taken before colostrum feeding. Calves infected in utero before 150 days will not mount an antibody response and can be PI.

The third, the tissues of neonatal calves showing congenital malformations should be tested to confirm their exposure to BVDV.

At last, surveillance should be carried out on the farm for animals showing clinical signs suspicious of mucosal disease [15].

As a result of present work, it is suggested that other dairy farms in Iran also need to carry out a similar program of testing for BVDV and then adopt an appropriate control policy in the light of the findings [3, 15]. To the best of our knowledge, no report has been published on calves persistently infected with BVDV in Iran. This study identifies the calves persistently infected with BVDV by ear-notch testing in southeast of Iran for the first time.

## REFERENCES

- [1] I. Firat, S. Ak, and H. Bozkurt, "Distribution of bovine viral diarrhoea virus (BVDV) in the genital system tissues of cattle," *Vet. Arhiv.*, vol. 72, pp. 235-248, 2002.
- [2] M. Van Vuuren, "Bovine viral diarrhea virus infection in livestock in Southern Africa. CAB reviews," *Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*, vol. 2005, pp. 4-12, 2005.
- [3] H. Houe, A. Lindberg, and V. Moennig, "Test strategies in bovine viral diarrhea virus control and eradication campaigns in Europe," *J. Vet. Diagn. Invest.*, vol. 18, pp. 427-436, 2006.
- [4] M. Hilbe, H. Stalder, and E. Peterhans, "Comparison of five diagnostic methods for detecting bovine viral diarrhea virus infection in calves," *J. Vet. Diagn. Invest.*, vol. 19, pp. 28-34, 2007.
- [5] T. Wittum, D. Grotelueschen, and K. Brock, "Persistent bovine viral diarrhoea virus infection in US beef herds," *Prev. Vet. Med.*, vol. 49, pp. 83-94, 2001.
- [6] L. A. Moczygemba, "Review of the relationship between persistent infection of cattle with bovine viral diarrhea virus and feedlot morbidity and gain," *Bovine Pr.*, vol. 37, pp. 155-161, 2003.
- [7] L. Potgieter, "Bovine viral diarrhoea and mucosal disease," *Infect Dis Livestock*, vol. 2, pp. 946-969, 2004.
- [8] J. Kampa, K. Stahl, and L. Renstrom, "Evaluation of a commercial enzyme-capture ELISA for detection of BVDV in routine diagnostic cattle serum samples," *Acta Vet. Scand.*, vol. 49, pp. 1-7, 2007.
- [9] C. Luzzago, M. Frigerio, and F. Tolari, "Indirect immunohistochemistry on skin biopsy for the detection of persistently infected cattle with bovine viral diarrhoea virus in Italian dairy herds," *New Microbiol.*, vol. 29, pp. 127-131, 2006.
- [10] T. Meiring, L. Prozesky, E. R. Du Preez, and D. J. Verwoerd, "The diagnosis and prevalence of persistent infection with bovine viral diarrhea virus in South African feedlot cattle," *Onderstepoort J. Vet. Res.*, vol. 78, p. 323, 2011.

- [11] T. Cornish, A. Van Olphen, and J. Cavender, "Comparison of ear notch immunohistochemistry, ear notch antigen-capture ELISA, and buffy coat virus isolation for detection of calves persistently infected with bovine viral diarrhoea virus," *J. Vet. Diagn. Invest.*, vol. 17, pp. 110-117, 2005.
- [12] S. Kuhne, C. Schroeder, and G. Holmquist, "Detection of bovine viral diarrhoea virus infected cattle—testing tissue samples derived from ear tagging using an Erns capture ELISA," *J. Vet. Med. B.*, vol. 52, pp. 272-277, 2005.
- [13] J. Ridpath, B. Hessman, and J. Neill, "Parameters of ear notch samples for BVDV testing: Stability, size requirements and viral load," presented at the Paper Presented at: Proc Am Assoc Bov Pract Conf., 2006.
- [14] M. Al-Khaliyfa, E. Abuelzein, and A. Gameel, "Identification of cattle persistently infected with BVDV by ear-notch testing in Saudi Arabia," *Vet. Rec.*, vol. 167, pp. 660-661, 2010.
- [15] J. Kampa, *Epidemiology of bovine viral diarrhoea virus and bovine herpesvirus type1 infections in dairy cattle herds*. Uppsala: Sveriges lantbruksuniv, 2006, 2006.
- [16] A. Lindberg and S. Alenius, "Principles for eradication of bovine viral diarrhoea virus (BVDV) infections in cattle populations," *Vet. Microbiol.*, vol. 64, pp. 197-222, 1999.
- [17] Components and Goals of Programs to Control BVDV, Available: [www.ars.usda.gov/SP2UserFiles/Place/36253000/BVD2005/Prod3\\_Smith\\_Hout.pdf](http://www.ars.usda.gov/SP2UserFiles/Place/36253000/BVD2005/Prod3_Smith_Hout.pdf). Updated Last Updated Date. [Accessed January 8, 2013], 2005.
- [18] P. Roeder and J. Harkness, "BVD virus infection: Prospects for control," *Vet. Rec.*, vol. 119, pp. 143-147, 1986.

**Table-1.** Detection by ELISA of BVDV antigen in ear notches from calves in 6 dairy farm herds in southeast of Iran

Animals	Number tested	Number positive (%)
Herd 1(87)	27	0
Herd 2(56)	23	1(0.78)
Herd 3(92)	24	0
Herd 4(69)	19	0
Herd 5(55)	18	0
Herd 6(83)	16	0
Total (442)	127	1(0.78)

*Views and opinions expressed in this article are the views and opinions of the author(s), Animal Review shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.*