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

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ABSTRACT

Bovine viral diarrhea 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 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 diarrhea 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.
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°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 diarrhea 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


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

<table>
<thead>
<tr>
<th>Animals</th>
<th>Number tested</th>
<th>Number positive (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herd 1(87)</td>
<td>27</td>
<td>0</td>
</tr>
<tr>
<td>Herd 2(56)</td>
<td>23</td>
<td>1(0.78)</td>
</tr>
<tr>
<td>Herd 3(92)</td>
<td>24</td>
<td>0</td>
</tr>
<tr>
<td>Herd 4(69)</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>Herd 5(55)</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>Herd 6(83)</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>Total (442)</td>
<td>127</td>
<td>1(0.78)</td>
</tr>
</tbody>
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