SEROPREVALENCE OF BRUCELLA SPP. IN BUFFALOES IN THE CENTRAL GUJARAT REGION OF INDIA

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ABSTRACT

Brucellosis remains a major threat from the zoonotic as well as the economic point of view. The prevalence of brucellosis in the central Gujarat was studied using the rose bengal precipitation test (RBPT), standard tube agglutination test (STAT) and indirect enzyme-linked immunosorbent assay (i-ELISA). The seroprevalence was found to be 12.75 percent, 11.16 percent and 19.12 percent by RBPT, STAT and i-ELISA, respectively.

Keywords: buffalo, brucellosis, seroprevalence

INTRODUCTION

Brucellosis has long been a major threat to livestock. It is mainly a disease of domestic animals caused by various strains of Brucella spp. Bovine brucellosis is found worldwide, but it has been eradicated from many countries. The rate of infection varies greatly from one country to another and between regions within a country. The disease causes heavy economic losses due to abortion, premature births, decreased milk yield and repeat breeding leading to temporary or permanent infertility in infected livestock (Yagupsky, 1999).

The diagnosis of the disease can be challenging and is frequently delayed or missed because the clinical picture may mimic other infectious and noninfectious conditions (Araj, 1999; Yagupsky, 1999). Diagnosis can be established by laboratory methods such as serology and blood cultures. Prolonged incubation periods, special growth media, and subcultures are required for the isolation of these fastidious, slow growing bacteria.

However, cultures are not always positive when other tests are positive (Romero et al., 1995). Automated systems have been reported to detect more than 95 % of Brucella melitensis-positive cultures within seven days of incubation (Yagupsky, 1999). The technology is lacking in developing countries or rural areas where the disease is prevalent and diagnoses rely mainly on serology. Many serological tests have been used for the diagnosis of human brucellosis, such as agglutination tests, indirect immunofluorescence, rose bengal plate test (RBPT), standard tube agglutination Test (STAT), and ELISA specially Dot-ELISA & Indirect-ELISA. The most commonly used tests are the serum agglutination test, Coombs anti-Brucella test, rose bengal test, and complement fixation (Orduña, 2000).

Buffalo milk and milk products are an appreciable source of income of farmers of India, that is why buffaloes are integral part of the economy of rural people. Hence, this study was carried out to find out the seroprevalence of Brucella spp. in central Gujarat, Anand, Kaira, Ahmedabad and Vadodara districts of Gujarat (India). These districts are one of the biggest pockets of milk production in India and also the location of a world famous dairy co-operative-AMUL.

MATERIALS AND METHODS

A total of 251 (230 female and 21 male) sera samples from buffaloes were collected from various places of four districts in Central Gujarat, viz., Anand (78), Kaira (60), Ahmedabad (86) and Vadodara (27). Collected sera samples were subjected to rose bengal plate test. (RBPT), standard tube
agglutination Test (STAT) and indirect-enzyme linked immunosorbant assay (i-ELISA). The RBPT antigen and Brucella abortus agglutinating antigen for STAT was procured from the Division of Biological Products, Indian Veterinary Research Institute (I.V.R.I.); Izatnagar, Uttar Pradesh (India). The tests were conducted as per manufacturer’s instructions. For i-ELISA, smooth lipopolysaccharide (S-LPS) based (A-B-ELISA) kits supplied by the All India Coordinated Research Project (AICRP) on Animal Disease Monitoring and Surveillance (ADMAS), Bangalore, was used. The test was performed as per the manufacturer’s instructions.

i-ELISA was compared with RBPT and STAT, considering i-ELISA as the gold standard test as per Hobbs (1985) and Nielsen et al. (1996), to determine the relative sensitivity and specificity of RBPT and STAT.

RESULTS AND DISCUSSION

Out of 251 sera tested during present study with RBPT, 32 (12.75 %) were found positive. With STAT, 28 (11.16 %) gave positive while 48 (19.12 %) reacted as positive when tested with i-ELISA. The highest (23.26 %) prevalence was found in Ahemdabad district, while prevalences were 20.51 %, 7.40 % and 16.67 % in Anand, Vadodara and Kaira districts, respectively (Table 1).

Out of 230 females and 21 males tested, 43 (18.70 %), 29 (12.61 %) and 25 (10.87 %) were found positive by the i-ELISA, RBPT, and STAT tests, respectively, in females while 5 (23.81 %), 3 (14.29 %), and 3 (14.29 %) were found positive in bulls by the respective tests.

The prevalence of brucellosis was 19.12 %. These findings were comparable to the results of Sharma and Saini (1995), who found 14.61 % prevalence in Punjab, India. This finding also supported Chatterjee et al. (1984) who found 19.6 percent prevalence.

Lower seroprevalences were reported by Isloor et al. (1998), 1.8 %; Mishra et al. (2005), 4.18 percent; Bhattacharya et al. (2005), 11.94 %; and Agarwal et al. (2007), 4.6 %, while the prevalence found in the present study was lower than that observed by Chauhan et al. (2000), 38.9 % in North Gujarat region of India, Chandramohan et al. (1992) 21.74 %.

The seroprevalences determined by various tests differed from one another. This could be due to variation in the numbers of false positives and false negatives detected by various tests. Similar findings were reported by Rao et al. (1999) and Singh et al. (2004).

In the present study, RBPT shows 64.58 % sensitivity and 99.50 % specificity when compared with i-ELISA. This is in agreement with Uzal et al. (1995) and Saravi et al. (1995), who reported 98.9 % and 99.7 % specificity, respectively. Prahlad Kumar et al. (1999) showed 33.33 % sensitivity; this was lower than the present findings.

Table 1. Geographical distribution of brucellosis antibodies.

<table>
<thead>
<tr>
<th>District</th>
<th>Number of samples tested</th>
<th>i-ELISA</th>
<th>RBPT</th>
<th>STAT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No. of samples +ve (%)</td>
<td>No. of samples +ve (%)</td>
<td>No. of samples +ve (%)</td>
</tr>
<tr>
<td>Anand</td>
<td>78</td>
<td>16 (20.51)</td>
<td>11 (14.10)</td>
<td>9 (11.53)</td>
</tr>
<tr>
<td>Vadodara</td>
<td>27</td>
<td>2 (7.40)</td>
<td>2 (7.40)</td>
<td>2 (7.40)</td>
</tr>
<tr>
<td>Ahemdabad</td>
<td>86</td>
<td>20 (23.26)</td>
<td>13 (15.11)</td>
<td>12 (13.95)</td>
</tr>
<tr>
<td>Kaira</td>
<td>60</td>
<td>10 (16.67)</td>
<td>6 (10.00)</td>
<td>5 (8.34)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>251</td>
<td>48 (19.12)</td>
<td>32 (12.74)</td>
<td>28 (11.16)</td>
</tr>
</tbody>
</table>
STAT showed 56.25 % sensitivity and 99.50 % specificity when compared with i-ELISA. Higher sensitivity (81.81 %) was observed by Agrawal and Batra (1999). Prahlad Kumar et al. (1999) reported more than 90 % specificity. The relative sensitivity of RBPT was 64.58 % and that of STAT was 56.25 %. The relative specificity observed was more than 99.00 % in the above case. Thus, i-ELISA test in conjunction with other serological tests can give more reliable diagnosis.

REFERENCES


