Seroprevalence of Brucellosis among Animals in Himachal Pradesh

Shalmali*, A.K. Panda, and R. Chahota

Department of Veterinary Public Health and Epidemiology
College of Veterinary and Animal Sciences, CSKHPKV, Palampur-176062 H.P.

(Received 08.08.2011; accepted 26.06.2012)

ABSTRACT

The aim of present study was to investigate the seroprevalence of brucellosis among animals in Himachal Pradesh. A total of 210 serum samples that were obtained from animals (110 from cattle and 100 from sheep and goat) from various regions of the state were screened through a battery of serological tests, which included RBPT, STAT, 2-MET, Dot-ELISA and Indirect-ELISA. With an overall seroprevalence of 13.08% among animals, the prevalence of brucellosis was detected in 11.08% and 16% samples from cattle and sheep and goat, respectively. Concluding on the efficacy of serological tests employed, I-ELISA and d-ELISA proved better than others in the diagnosis of the brucellosis and a battery of the serological tests should be used to get the accurate picture.

Keywords: Brucellosis, cattle, goat, Himachal Pradesh, sheep

Brucellosis is a zoonotic disease that still is one of the major veterinary public health and economic concerns globally. It is an important deceptive infectious disease, which remains under diagnosed in India. The disease is caused by Gram negative, coccobacilli, of genus Brucella. Species have been designated on the basis of host preference, antigenic and biochemical characteristics as: Brucella melitensis (goat and sheep), B. abortus (cattle), B. suis (pig), B. canis (dog), B. ovis (sheep), B. neotome (wood rat), B. pinnipidea (whale), B. cetacea (crustaceans). B. melitensis and B. suis can also cause bovine infection. Sexually matured animals are more affected. Transmission occurs by direct contact and environmental contamination caused by aborted conceptus. In animals, brucellosis results in inflammation of reproductive system in both sexes and abortions, stillbirths in matured females and epididymitis in males (cattle and sheep/goat), hygroma (young calves) and poll evil (horse).

In Himachal Pradesh, since animal husbandry is a major source of livelihood in hilly terrain. The present investigation was carried out for assessing the seroprevalence of brucellosis in animals. Aseptic collection of blood was done from sheep, goat and cattle, through intravenous route. Serum was obtained by blood clot method and preserved by keeping under deep refrigeration. Rose Bengal plate test (RBPT), standard tube agglutination test (STAT) and 2-mercaptoethanol test (2-MET) performed as described by Alton et al. (1975). Indirect enzyme linked Immunosorbent assay (I-ELISA) and dot-ELISA was performed as per Hudson and Hay (1991) and Batra et al. (1989), respectively. Statistical analysis of the data was done according to the methods described by Martin et al. (1987).

The present study revealed the overall seroprevalence of animal brucellosis to be 13.81% in Himachal Pradesh (Table 1). Sheep and goat revealed higher seroprevalence (16.00%) than cattle (11.8%). In an earlier study within the state, conducted by Charanjeet et al. (2004) revealed 4.8% seroprevalence. Further the status of seroprevalence among organised herds and unorganised herds was found to be 17.77% and 10.11%, respectively. A close contact and high density of animals in the organised herd seems to contribute to the spread of disease.

*Corresponding author: shalmali.vet@gmail.com

1Department of Veterinary Microbiology, College of Veterinary and Animal Sciences, CSKHPKV, Palampur
Table 1. Species wise seroprevalence of brucellosis

<table>
<thead>
<tr>
<th>Description</th>
<th>Cattle</th>
<th>Sheep and goat</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samples tested</td>
<td>110</td>
<td>100</td>
<td>210</td>
</tr>
<tr>
<td>Samples positive</td>
<td>13</td>
<td>16</td>
<td>29</td>
</tr>
<tr>
<td>Seroprevalence</td>
<td>11.82%</td>
<td>16.00%</td>
<td>13.80%</td>
</tr>
</tbody>
</table>

Table 2. Comparative evaluation of different serological tests for detection of Brucella antibodies in serum samples of animals

<table>
<thead>
<tr>
<th></th>
<th>Cattle</th>
<th>Sheep and goat</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title/ test</td>
<td>R</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>%positive</td>
<td>3.64</td>
<td>5.45</td>
<td>3.64</td>
</tr>
<tr>
<td>R</td>
<td>9.61</td>
<td>6.73</td>
<td>5.49</td>
</tr>
</tbody>
</table>

R= RBPT, S=STAT, M=2-MET, d-E= Dot ELISA, I-E= Indirect ELISA

Among the battery of serodiagnostic tests (d-ELISA, I-ELISA, STAT, 2-MET and RBPT) employed in the present study, d-ELISA proved to be more sensitive (17.14% seropositive) than others (Table 2). Brucella reactors with positive STAT titre value were detected positive by both enzyme immunoassays. RBPT detected the least number of positive reactors, but all the seropositives detected by this method, were also positive by the other tests employed in all the species.

STAT and 2-MET showed very negligible difference in seroprevalence estimated by each of them. As 2-mercaptoethanol destroys the acute infection immunoglobulins, the serum dilutions are left with only immunoglobulins IgG, therefore this test generally differentiates between the acute and chronic case of brucellosis. Thus, out of 210 samples 2 samples (0.95%) indicated acute infection of brucellosis on the basis of 2-MET (Table 2).

Comparative study of the serodiagnostic tests for brucellosis revealed the immunoassays as the most efficient diagnostic tests (Saramurthi et al., 2003; Asghar et al., 2005). Other studies have also found the immunoassays to be highly efficient in the detection of brucellosis in various species of animals.

Reliable diagnostic methods are the cornerstones for the success of any surveillance programme. Since, the individual test sometimes do bear variable efficacy, it is therefore, essentially recommended that a battery of serodiagnostic tests should be applied in order to ensure detection of true diseased animals.

Acknowledgments

Cooperation of Department of Veterinary Microbiology, DGCN COVAS, Palampur and IVRI (Regional Station), Palampur is duly acknowledged.

References