Seroprevalence of Leptospiral infection in goats of Ahvaz

Haji Hajikolaei, M. R.1, Ghorbanpour, M.2, Keshavarzi-Yangabadi, M.3, Abollaour, Gh. R.4

1Department of Clinical Sciences, Faculty of Veterinary Medicine, Shahid Chamran University, Ahvaz-Iran.
2Department of Microbiology, Faculty of Veterinary Medicine, Shahid Chamran University, Ahvaz-Iran.
3Graduated from the Faculty of Veterinary Medicine, Shahid Chamran University, Ahvaz-Iran.
4Department of Clinical Sciences, Faculty of Veterinary Medicine University of Tehran, Tehran - Iran.

(Received 27 August 2006, Accepted 24 October 2006)

Abstract: In a serological survey to investigate the prevalence of leptospiral infection in goats in Ahvaz, blood samples were taken from 172 female goats. They were initially screened at serum dilution of 1: 100 against six live antigens of leptospira interorgans serovar pomona, canicola, hardjo, ballum,icterohemorrhagiae, and grippotyphosa using the microscopic agglutination test (MAT) and samples were considered positive, if 50% or more of agglutination of leptospires in a dilution of 1: 100 or greater was found. Sera with positive results were titrated against reacting antigens in serial twofold dilution from 1:100 to 1:1600. Antibodies against one or more serovars were detected in 18 (10.46%) sera at dilution ≥ 1: 100. Antibodies against more than one serovar were found in 5 (27.77%) positive sera. Antibodies were most frequent to serovar grippotyphosa (39.13%) followed by in descending, canicola (26.80%), pomona (21.72%), icterohemorrhagiae (8.69%) and hardjo (4.34%).

Key words: Leptospirosis, goat, Ahvaz.

Introduction

Leptospirosis is a common global zoonotic disease of man and in all farm animals species specially in sub-tropical and tropical regions of the world. Most leptospiral infections in sheep and goat are asymptomatic but may result in high fever, abortion, stillbirth, agalactiae and prenatal death. Affected lambs and kids may manifest fever, jaundice and hemoglobinuria, which may also result in death (1, 4, 16).

Unfortunately, a definitive diagnosis of leptospirosis is difficult to make. Most of diagnostic laboratories do not attempt to isolate leptospires because of their fragile nature, cost and complexity of the isolation media, and prolonged incubation period (5, 16). Therefore, recognition of leptospiral infection has been based generally on serological evidence. A wide variety of serological tests, which show varying degrees of serogroups and serovar specificity, have been described. A wide variety of serological tests, which show varying degrees of serogroup and serovar specificity, have been described. Two tests have a role in veterinary diagnosis: the microscopic agglutination test (MAT) and the enzyme-linked immunosorbent assay (ELISA) (14).

Previous serological surveys of leptospiral infection in Ahvaz were carried out on cattle, buffalo, horse and donkey (8, 9, 10). These surveys indicated that leptospiral infection is common in these animals. Because, there was no evidence of the study on leptospiral infection in goat in Ahvaz, this study was carried out to determine the prevalence of leptospirosis antibodies in goat and compare with other farm animals.
Materials and Methods

Blood samples were taken from 172 female goats from 5 suburbs of Ahvaz, Southwest of Iran, during January to March of 2003. None of these animals had been vaccinated against leptospires. According to dental formula, these goats were divided into 5 age groups (≤1, 1.2, 3 and ≥4 years old). The numbers of samples from suburb one to five were 52, 36, 25, 15, and 44, respectively. At the time of blood collection all of the examined animals appeared healthy and presented no clinical sign suggestive of leptospirosis. Ten ml of blood was collected from the jugular vein of each goat. The blood samples were allowed to clot and were centrifuged for 10 min at 2500g. After centrifugation, the serum was removed and stored at -20°C until ready for test.

The sera were tested for antibodies to six live antigens of leptospira interrogans (L. intergans serovar pomona, canicola, hardjo, ballum, icterohemorrhagiae, grippotyphosa) using the microscopic agglutination test (MAT) in Leptospiral Research Laboratory in Faculty of Veterinary Medicine, University of Tehran. According to the methods of OIE, sera were initially screened at a dilution of 1:100 against these antigens. At first, serum dilution of 1:50 was performed and a volume of each antigen, equal to the diluted serum volume, was added to each well of microtitrations plates, making the final serum dilution 1:100. The microtitrations plates were incubated at 29°C for 2 h. The plates were examined by dark-field microscopy. Results were considered positive when 50% or more of agglutination of leptospires were found (OIE, 2000). Sera with positive result were titrated against reacting antigens in serial twofold dilution from 1:100 to 1:1600.

Obtained results were analyzed statistically using chi-square and fisher's-exact test with confidence level 95%.

Results

Antibodies against one or more serovars were detected in 18 (10.46%) goats. The highest number of reactors was due to grippotyphosa (39.3%), followed in descending order by canicola (26.08%), pomona (21.72%), icterohemorrhagiae (8.64%), and hardjo (4.34%). None of the sera were reacted to ballum. The majority of titre levels were between 1: 200 to 1: 400 for all serovars and the frequency of 1:100, 1: 200, 1: 400 and 1: 800 was 13.04%, 34.78% 34.78% and 17.39%, respectively.

Antibodies against more than one serovars were found in 5 (27.77%) sera, so that mixed infection of pomona and grippotyphosa, canicola and grippotyphosa, hardjo and icterohemorrhagiae were seen in 2, 2 and one positive sera, respectively.

There is significant difference in age distribution of leptospiral infection in seropositive goats (p<0.05). There is a tendency in adult goats to be more seropositive than younger ones.

Statistical analysis showed there is not an area dependent antibody response to leptospiere. Distribution of seropositive goats in various suburbs was no significant difference but suburb two and suburb four had highest and lowest number of seropositive goats.

Discussion

Antibodies against one or more serovars were detected in 18 (10.46%) goats. The prevalence of leptospiral infection in goats from another countries based on serological survey has been reported to be 1.2%, 55.2%, 42.1%, 70%, 13.1% and 19.7% in France, India, Egypt, New Zealand, Nigeria, and Bolivia, respectively (1, 3, 7, 12, 17, 18). There is only one documented report of leptospiral infection in goats from Iran. This study was carried out on goats from Uremia by Zainali et al., (1997) that reported 27.5% of goats from this area had leptospiral antibodies (19). These reported results confirm that prevalence of leptospiral infection in goat is different between countries. These differences may be the consequence of environmental factors and control efforts. It seems the prevalence of leptospiral infection in Ahvaz is lower than of some countries specially in contrast with uremia. Since, at present, there is no specific control strategy against leptospirosis in Ahvaz, this can not therefore be attributed to control efforts. On the other hand, environmental factors have been shown in influence...
Serorevalence of leptospiral infection...

Table: Distribution of serovar specific antileptospiral antibodies and theirs titration in seropositive goats.

<table>
<thead>
<tr>
<th>Serovar</th>
<th>1: 100 (%)</th>
<th>1: 200 (%)</th>
<th>1: 400 (%)</th>
<th>1: 800 (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grippotyphosa</td>
<td>0 (0)</td>
<td>4 (17.39)</td>
<td>4 (17.39)</td>
<td>1 (4.35)</td>
<td>9 (39.13)</td>
</tr>
<tr>
<td>Canicola</td>
<td>1 (4.34)</td>
<td>3 (13.02)</td>
<td>1 (4.34)</td>
<td>2 (8.69)</td>
<td>6 (26.08)</td>
</tr>
<tr>
<td>Pomona</td>
<td>1 (4.34)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>5 (21.37)</td>
</tr>
<tr>
<td>Icterohemorrhagiae</td>
<td>1 (4.34)</td>
<td>0 (0)</td>
<td>1 (4.34)</td>
<td>0 (0)</td>
<td>2 (8.69)</td>
</tr>
<tr>
<td>Hardjo</td>
<td>0 (0)</td>
<td>1 (4.34)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>1 (4.34)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>3 (13.04)</td>
<td>8 (34.78)</td>
<td>8 (34.78)</td>
<td>4 (17.3)</td>
<td>23 (100)</td>
</tr>
</tbody>
</table>

Table: Distribution of leptospiral infection in age groups of goats.

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>No. positive (%)</th>
<th>No. Negative (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>1 (7.14)</td>
<td>13 (92.86)</td>
<td>14</td>
</tr>
<tr>
<td>1</td>
<td>0 (0)</td>
<td>22 (100)</td>
<td>22</td>
</tr>
<tr>
<td>2</td>
<td>2 (5.12)</td>
<td>37 (94.88)</td>
<td>39</td>
</tr>
<tr>
<td>3</td>
<td>9 (23.07)</td>
<td>30 (76.93)</td>
<td>39</td>
</tr>
<tr>
<td>≥4</td>
<td>6 (10.34)</td>
<td>52 (89.66)</td>
<td>58</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>18 (10.46)</td>
<td>154 (89.54)</td>
<td>172</td>
</tr>
</tbody>
</table>

Table: Distribution of leptospiral infection in goats from various suburbs of Ahvaz.

<table>
<thead>
<tr>
<th>Suburb</th>
<th>No. Positive (%)</th>
<th>No. Negative (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4 (7.69)</td>
<td>48 (92.31)</td>
<td>52</td>
</tr>
<tr>
<td>2</td>
<td>5 (13.88)</td>
<td>31 (86.12)</td>
<td>36</td>
</tr>
<tr>
<td>3</td>
<td>2 (8.00)</td>
<td>23 (92.00)</td>
<td>25</td>
</tr>
<tr>
<td>4</td>
<td>1 (6.66)</td>
<td>14 (93.34)</td>
<td>15</td>
</tr>
<tr>
<td>5</td>
<td>6 (13.63)</td>
<td>38 (86.37)</td>
<td>44</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>18 (10.46)</td>
<td>154 (89.54)</td>
<td>172</td>
</tr>
</tbody>
</table>

of development of leptospiral infection in animal and human beings. Long term survival of pathogenic leptospires outside the host requires a warm, moist environment with pH that is near natural (13). According to climate situations in Ahvaz it has been expected that leptospiral infection in goat was nearly similar to a previous reports in cattle, buffalo, horse and donkey in Ahvaz. Because, in previous serological surveys the prevalence of leptospiral infection was 53.79%, 58.73%, 27.88% and 40% in cattle, buffalo, horse and donkey, respectively (8, 9, 10). It may be due to the behaviors of the goat, which is differing with other animals. This animal habitually tries to use the head branches of grass and stay in muddy and swampy grounds less than others that it results to less expose to leptospires.

The predominant leptospire serovars in serological reaction varies some what between countries. For example: autumnaulis, pomona, automalis, poi, bratislava and icterohemorrhagiae were the common serovars in goat in Egypt, Nigeria, India, Bolivia, Italy, and France, respectively (1, 2, 3, 12, 18). In addition, one serovar may be predominant in a country but none of the animal reacted with this serovar in another ones. This emphasizes the need for regional surveys for leptospirosis, since host-parasite relationship may change depending on the ecology of the region. Grippotyphosa was present in 39.13% of seropositive goats in this study making it the most prevalent of all serovars for which we tested. On the other hand, grippotyphosa was the predominant serovar in cattle, horse and donkey in Ahvaz (9, 10). It is probable that this serovar may be adapted to and maintained by these farm animals in Ahvaz. There is need for further investigation on clinical cases of leptospirosis to determine whether this serovar is main cause of leptospirosis in this area.

Percentage of seropositive for more than one serovar was 27.77% in seropositive goats. In serological tests for leptospirosis such as MAT, the
results often indicate infection with more than one serovar (6, 9, 10, 11). This may be the result of mixed serovar infection but the existence of cross reactivity in the MAT between the serovars is well known and can be excluded from this interpretation.

In conclusion, the results of this study indicate that leptospiral infection is endemic in Ahvaz and that various serovars concur in the etiology of leptospirosis. Because of the importance of Leptospira interrogans as an abortifacient agent in goat, it will be considered as one of the possible causes of abortion in goat in Ahvaz.

Acknowledgments
The authors would like to acknowledge the research vice chancellors of Shahid Chamran University for financial support for thesis project number 454.

References
مطالعه سرولوزیکی عفونت لپتوسیر جو در بزرگداشت

محمد رحم حاجی‌کلاته‌ای * سعید قربانی‌پور ** مجتبی کشاورزی پیکتی‌پور *** غلام‌رضا عبادالله‌پور ****

5. گروه علوم درمانگاهی، دانشگاه تهران‌شهرکی‌درمانگاه‌شیراز‌شهرک‌درمانگاه‌جهان‌شهرک‌درمانگاه‌پیکتی‌پور **
6. گروه علوم درمانگاهی، دانشگاه تبریز‌شهرکی‌درمانگاه‌درمان‌شهرک‌درمانگاه‌پیکتی‌پور ***
7. گروه علوم درمانگاهی، دانشگاه تبریز‌شهرکی‌درمانگاه‌درمان‌شهرک‌درمانگاه‌پیکتی‌پور ****

8. گروه علوم درمانگاهی، دانشگاه تبریز‌شهرکی‌درمانگاه‌درمان‌شهرک‌درمانگاه‌پیکتی‌پور

اداره‌های مدیریت: 5 شهریور ماه 1385

به منظور بررسی سرمی عفونت لپتوسیری در بزرگداشت، نمونه خون از 172 نفر، بزرگداشتی در دمای 40 درجه سانتی‌گراد که در این نمونه 1 آناتومی زن زده، لپتوسیری، اینترولیت‌ها و سایر علائم و علل بیماری‌ها در نظر گرفته می‌شود. نمونه‌هایی که در آنها 1/3 درصد لپتوسیری، از جمله اینترولیت‌ها و سایر علائم و علل بیماری‌ها در نظر گرفته می‌شوند. سپس از نمونه‌های مثبت رفتاری مختلف، نانو 1/100 تا 1/1000 تا 1/10000 می‌باشد. از این‌ها 1/1000 تا 1/10000 می‌باشد. از این‌ها 1/10000 تا 1/100000 می‌باشد. از این‌ها 1/100000 تا 1/1000000 می‌باشد. از این‌ها 1/1000000 تا 1/10000000 می‌باشد. از این‌ها 1/10000000 تا 1/100000000 می‌باشد. از این‌ها 1/100000000 تا 1/1000000000 می‌باشد. از این‌ها 1/1000000000 تا 1/10000000000 می‌باشد. از این‌ها 1/10000000000 تا 1/100000000000 می‌باشد. از این‌ها 1/100000000000 تا 1/1000000000000 می‌باشد. از این‌ها 1/1000000000000 تا 1/10000000000000 می‌باشد. از این‌ها 1/10000000000000 تا 1/100000000000000 می‌باشد. از این‌ها 1/100000000000000 تا 1/1000000000000000 می‌باشد.

واژه‌های کلیدی: لپتوسیری، رژیم، بیمارستان.