The lyme disease: results of a serological study in sheep, cows and dogs in Bulgaria

I.S. ZARKOV and M.M. MARINOV

SUMMARY

Blood samples obtained from 499 cows, 512 sheep, and 106 dogs, coming from villages with Lyme disease in humans, were studied for IgG against *Borrelia burgdorferi* by IIFA. Antibodies to *B. burgdorferi* were detected in 56.25% from the sheep, in 54.31% from the cows, and in 22.64% from the dogs studied.

Data obtained with the cows not treated against ectoparasites at 54.3% were similar to the results with the sheep treated only once per year at 56.25%.

Difference of 13.6% & 22.6% was observed when we compared the dogs regularly treated against ectoparasites (20.8%) to the dogs that had not been treated.

Introduction

The epizootic process of the Lyme borreliosis affects animals of different species, a fact that further elucidates development of epidemics among people. Domestic animals living very close to man are of a special interest as a potential reservoir of the infection [1]. Hence the importance of the precise determination of the range of distribution of infection among these animals. However, data in this aspect are limited to a small number of animals and a particular animal species. Some of the authors we referred to examine large ruminants and horses, others - small ruminants, and still others - pets.

The positive serological tests in animals, in parallel with the propagation of Ixodes, f. Ixodidae mites that are the most common middle-agents of Borrelia burgdorferi, indicate the risk of infection among people from the same region [13, 15]. Another determinant could be the duration of the risk of infection among people from the same region [12, 13].

Materials and methods

1) EXPERIMENTAL ANIMALS.

A total of 1117 clinically unaffected adult animals were examined, including 499 cows, 512 sheep coming from 44 villages, and 106 dogs coming from 13 villages, where the Lyme disease had been found out in people.

Cow herds numbered from 20 - 50 animals and sheep flocks - from 100 - 200. During winter they were kept in stalls and pens on private premises while during the warm months animals often visited the same pastures or fields after harvesting, accompanied by a shepherd and a dog or two.

Cows had not been treated with acaricides; sheep had been treated once annually with phosphorous organic preparations. Two groups of dogs were studied; 84 of the dogs had never been treated while 22 dogs had been regularly treated with acaricides via collars impregnated with organic phosphorous preparations.

Blood sera obtained were stored at - 20° C until studies. Blood samples were collected from 5 % - 10 % of all the adult cows; from 2% from the sheep after collection of wool (May - June); and from all pet and shepherd dogs.

2) METHODS

IIFA was used. Heat-killed whole cells of Borrelia burgdorferi strain B31 in dextrane solution supplied by Kirkegaard & Perry Laboratories (USA) were used as antigen. Monospecific anti-bovine, anti-ovicine and anti-canine IgG marked with FITC were supplied by Sigma.

Antigen was pored on glass, dried & flame-fixed thrice. The fixed antigen and the patients’ sera were incubated at 37 °C for 30 min. Two consecutive values of serum dilutions 1:128 and 1:256 had been prepared [2]. The sera were rinsed thrice in PBS at pH 7.4, dried & finally processed with the relevant mono-specific anti-bovine, anti-ovicine or anti-canine IgG marked with FITC. Then they were incubated at 37 °C for 30 min. After repeating the procedure of rinsing in PBS and drying, results were recorded on a Leitz Diaplan fluorescent microscope at x 1000 magnification.

Results and discussion

The results given in Table 1 illustrate the blood serum assay. Positive sera were determined in all the three species of animals thus supporting the results of other authors [2, 5, 6, 9, 10, 11, 17]. Significant was the share of seroreagents in sheep (56,25%), cows (54,31%), and dogs (22,64%). Results confirming Borrelia burgdorferi infection were accompanied by the propagation of Ixodes ricinus mites [13] in parallel with clinical diagnosis of Lyme borreliosis in people from the same regions [12].

Our values in sheep and cows were higher than the referred to: 40 % in sheep [11] and 33% in cows [9]. Results with dogs were of a similar range, from 1 % [5] to 76.3 % [10].

The lower values in dogs compared to sheep and cows might be related to the fact that 20.8 % of the dogs had been regularly treated with acaricides (Table 2). We suggested that...
preventive measures disconnect the chain of transmission of Borrelia burgdorferi by killing the mites. Much lower was the percent of seroreagents in the treated dogs at 13.63% compared to 22.62% in the untreated dogs. Data from sheep that had been treated once a year showed that one annual treatment against mites had not been efficient.

Evidence that animals are hosts of Borrelia burgdorferi are related to the epizootic process and control of infection. Borrelia burgdorferi infection in people plays an important role in human pathology.

Conclusions

1. Borrelia burgdorferi infection in cows, sheep, and dogs was serologically determined.

2. The share of seroreagents was 56.25% in sheep, 54.31% in cows, and 22.64% in dogs studied.

3. In regularly treated with acaricides dogs only 13.6% were positive compared to 22.6% from those that were not treated.

References


9. — KRAMPITZ H. E. and BARK S. : Zur Epidemiologie der Ixodes -
10. — MAGNARELLI L. A., ANDERSON J. E., SCHREIER A. B. and
FICKE C. M. : Clinical and serologic studies of canine borreliosis,
11. — MITCHELL G. B. B. and SMITH I. W. : Lyme disease in Scotland:
results of a serological study in sheep. Veterinary Record, 1993, 133,
5, 66 - 67.
12. — MARINOV M. M. : Epidemiological investigations of cases with
Lyme borreliosis in region Stara Zagorja, Infectologia, 1994, XXXI, 4,
16 - 17.
ticks in region Stara Zagorja, Conference - 20-ty years of Medical
the transmission of the Lyme disease spirochae to sheep in
15. — RAND P. W., SMITH R. P. and LACOMBE E. H. : Canine seropre-
valence and the distribution of Ixodes dammini in an area of
10, 1331 - 1334.
16. — RICH S. M., ARMSTRONG P. M., SMITH R. D. and TELFORD S.
R. : Lone stak tick - infection borreliae are most closely related to the
497.
17. — WIEBE K. R. : Canine Lyme borreliosis in Ontario - A case report,