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Monitoring Leptospirosis Affecting Dogs in Eastern Slovakia

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Abstract: The clinical course of canine leptospirosis depends on the serotype of the causative agent and pathogenicity of the particular strain. In an effort to get accurate information about the leptospirae infestation of dogs and the part played by different serovars, 314 dogs including house pets, guard dogs and other working dogs from Kosice and other districts of Eastern Slovakia were examined clinically and serologically. For serological investigation the MAR test and 15 leptospira antigens after the method of Kmety and Bakoss (1978) were used. The positive reactions were confirmed by the presence of four serovars, the largest percentage being *L. icyterohaemorrhagiae* in 46.1 percent and *L. grippotyphosa* in 35.9 percent. The serovars *L. bratislava* in 10.3 percent and *L.canicola* in 7.7 percent were found from all the positive dogs. We could hypothesize that 3 case of positive serovar *L. canicola* could be the result of a modification of the epidemiological situation of canine leptospirosis or due to post-vaccination responses. The casuistic case of acute leptospirosis here described referred to a hepato-renal syndrome and cardiac insufficiency.

Key words: Leptospirosis, dogs, clinical signs, serology

Introduction

Leptospirosis has been diagnosed in every part of the world. In 1922 Lukes discovered that leptospira was the causative agent in a widespread epizootic of Stuttgard disease. Since then a number of clinical and serological tests have been carried out in Czechoslovakia. In the years 1985 and 1986, we undertook the first of these investigations in Eastern Slovakia.

Leptospirosis is caused by different leptospira serovars, which infect most wild domestic animals and man. It is transmitted via the urine of affected animals for a long time after their infection. Mucocutaneous contact with leptospirae in the environment is the usual form of transfer, and wild animals and rodents are reservoirs. The leptospirae principally attack the kidneys and the liver, sometimes causing disseminated vascular coagulation. Vaccinated and adult dogs develop subclinical infection as do all cats. Leptospiraemia appears within the first two weeks of infection. Systemic clinical signs include fever, vomitus, inappetentia and dehydration. Acute renal and hepatic failure can also develop.

From the epidemiological point of view the ability of leptospirae to survive a longer period via urine.

The aim of the present work was to obtain current higher temperatures, moisture, and slightly alkaline environment is very important. Moreover, leptospirae can survive for a long time in the kidneys of hosts and reservoir animals. Leptospirae can be transmitted for data on the prevalence of leptospirae in Eastern Slovakia. We traced the changes in the occurrence of serovars which infect dogs, and occasionally came across leptospirosis in their owners. Furthermore, casuistic cases were recorded in dogs.

Materials and Methods

From 1994 to 1997, we followed the course of leptospirosis clinically and serologically in 314 dogs from Kosice and other cities in Eastern Slovakia. Among this number were household pets, guard dogs and police dogs which were also preventively monitored for Lyme disease. The dogs used for this appeared to be healthy and were without any previous history of leptospirosis. There was a clinical examination and blood was withdrawn from the vena jugularis and the vena cephalica antebrachii at the clinic of the Department of Internal Diseases of Small Animals, the University of Veterinary Medicine, Kotice, Slovakia.

The serological investigation with microagglutination reaction (MAR) with 15 leptospirae antigens after the method of Kmety and Bakoss (1978) was carried out at the Department of Epidemiology, the Faculty of Medicine, the University of P.J.tafarik, Koice, Slovakia.

A case of acute leptospirosis in a 5-year-old Sheltie female was monitored clinically and serologically. The dog was referred with a history of an acute, febrile disease with icterus, anorexia and depression. The dog was not vaccinated against leptospirosis. The diagnosis of leptospirosis was confirmed on the basis of the clinical signs, serology, gross lesions and pathohistological findings.

Results and Discussion

Out of 314 dogs examined, 39 dogs (12.4%) were found to have Leptospira antibodies (Table 1). Positive reactions were recorded with four serovars, the commonest being *L. icterohaemorrhagiae,* otherwise *L. copenhageni* in 18 cases out of the 39, which is 46.1 percent, with *L. grippotyphosa* in 14 cases out of the 39, which is 35.9 percent, four cases with *L. bratislava* (10.3%) and in three samples of sera, we diagnosed *L. canicola* (7.7%). The titre of specific antibodies was assessed in the ratio of 1:100 and higher. Table 2 sets out the results of the examination of the dogs on the basis of age and type of life. The largest group of dogs monitored were private guard dogs (113). In this group we recorded the highest percentage (15%) of leptospirosis positively. Second place was taken by other guard dogs (police dogs etc.) with 13.4 percent. In the household pet class, 7 positive cases (7.9%) were found. Positive reactions increased slightly with age.

Serological investigation gave us the basic information for epidemiological determination. Positive findings of specific antibodies in dogs demonstrates the very frequent contacts with leptospira infection, which develops in apparently. It is not possible to determine this as a latent or chronic leptospirosis automatically. According to literature data (Petru and Pokorny, 1955; Lehkjt, 1965; Sebek and Wurst, 1972; Husak *et al.*, 1978; Prokopcakova *et al.,* 1994; Treml and Hejlicek, 1988; Duricic *et al.,* 1993; Scanziani *et al.,* 1994), the prevalence of individual serovars differs from country to country, from region to region and according to season.

In Slovakia, a twofold increase was observed (12.4%) in the prevalence of leptospirae in dogs compared with ten years previously 16.8%. Changes were also found in the types of serovars present. In 18 cases from the total number (46.1%),

Table 1: The serological results of 314 dogs investigated for the presence of leptospiral antibodies on the base of their titre level

Serovars	Number of positively 39/12, 4%		Level of antibody response			
	abs	%	1:100	1:200	1:400	1:800
L. icterohaemor	18	46.1	6	6	4	2
L. copenhageni						
L. grippotyphosa	14	35.9	3	4	5	2
L. bratislava	4	10.33	1	1	2	-
L. canicols	33	7.7	-	2	1	-

Table 2: The results of the investigation of 314 dogs the presence of leptospiral antibodies in relation to their age and life style

Age	Life Style		
	Household pets positive reaction	Private guard dogs positive reaction	Police dogs positive reaction
1-2	15/0	12/1	8/0
3-4	30/0	40/1	25/2
5-6	16/1	31/1	36/3
7-8	24/3	17/6	20/5
9 and more	4/3	13/6	23/5
Total number	89/7	113/17	112/15
Absolute/Positive	17,9)	(15,0)	(13,4)

L. icterohaemorrhagiae (L. copenhageni) was detected. Positive results with the above-mentioned serovars were found in the same ratio in all guard dogs aged from 5 to 9 years old. This prevalence could be explained by the more frequent contact between these dogs and rats, which are the min reservoir of this serovar. With regard to age, the same observation was made by Husak *et al.* (1978) and Bakoss *et al.* (1992). The latter was concerned with the length of exposure to leptospirae.

According to last years report on people in Eastern Slovakia, there was a slight increase in the occurrence of *L. icterohaemorrhagiae.* In 36 percent, we obtained an increase in the number of *L. grippotyphosa,* which agrees with the findings of Sebek and Wurst (1972), Treml and Hejlicek (1988), Mmera (1991) and Bakoss *et al.* (1992). This serovar was observed for a long time in the course of the serological monitoring of small mammals-in particular mice and shrews (Prokopcakova *et al.,* 1994; Stanko *et al.,* 1996). The prevalence of this serovar was also described by Duricic *et al.* (1993) and Scanziani *et al*. (1994). The detection of the serovar *L. bratislava* is made less frequently but the results differ between authors, especially in-Slovakia (Bakoss and Kmety, 1992). The higher percentage occurrence of the serovar *L. bratislava* in dogs was noted by other authors also, e.g. Scanziani *et al.* (1994), who concluded that this serovar was dominant in dogs in Italy. Likewise, Van den Broek (1991) detected a higher percentage-in serologically tested dogs in Edinburgh and Glasgow. in our comprehensive monitoring, we detected *L. canicola* in three blood sera i.e. 7.7 percent, two in lower titres and one in titre 1:400, which we considered an interesting finding. The detection of *L. canicola* seems, from our point of view, to be very important. According to literature data this serovar was less frequently detected over the last fifteen years both in other countries and ours for no apparent reason (Sebek 1986; Gsell 1990; Rentko *et al.,* 1992; Bakoss *et al.,* 1992). Thirty years ago in our country, *L. canicola* was detected by Kmety and Bakoss (1978), who undertook the serological examination of dogs in a laboratory in Bratislava, and discovered this serovar with 80 percent positively. It was an acute epizootic leptospirosis caused by *L. canicola.* In these years in the Eastern part of our country, 18 percent of positive cases with *L. canicola* were detected. The above mentioned authors in 1992, following further serological examination in the same region, detected only one positive case in dogs with *L. canicola.* Our screening ten years ago did not reveal any positive case with this serovar. Our new findings do not rule out the possible occurrence of infection by *L. canicola* in our condition. A few years ago in St.Petersburg, a small epidemic of leptospirosis was described by Stojanova *et al.* (1993). They successfully isolated serovars of *L. canicola* from dogs, whose owners were also affected.

Our study focused on the clinical examination and epizootiological monitoring of animal contacts with one another and with the basic reservoir in their environment. We also carried out repeated serological checks on animals in which we had found a slight decrease in titre of antibody response over 6 and 12 months. The possibility of leptospira infection was also followed in the owners of positive dogs in 20 cases out of 39. In the owners the results were negative.

In the animals followed in our present study we have not found any cases of *L. pomona* compared with our earlier examination. Ten years ago, we discovered that 25 percent of cases were positive. This serovar was the second most frequently detected after *L. grippotyphosa.* Previously in Eastern Slovakia, *L. pomona* was successfully isolated from a murine reservoir, and we inferred some connection between the positively of our dogs and the existence of this serovar in the reservoir. *L. pomona* has been recently detected in small rodents occasionally, which indicates that some changes have been occurring, which ask for analysis.

In a casuistic case of acute leptospirosis, the clinical signs referred to a hepato-renal syndrome and cardiac insufficiency. The sign of gastroenteritis and severe dehydratation were present. The haemogram revealed leukocytosis and neutrophilia with a left shift and thrombocytopenia. The blood biochemistry profile showed hyperglobulinemia, hyponatremia, hypokaiemia and increases in ALT, AST, ALP enzymes, bilirubin, creatinine and urea. Urine analysis showed proteinuria, hematuria, bilirubinuria, pyuria and cylindruria. Antibiotic and symptomatic treatment were indicated. This lasted two days, after which the dog died. Serological examination confirmed the diagnosis. Icterus gravis of all tissues and mucous membranes, myo-degeneration and dilatation of the heart, hepatopathy and nephrocirrhosis, venostasis in kidney, splenic tumour and disseminated haemorrhages of digestive system and pleura were present. These confirmed leptospirosi

Weils disease) caused by *L. icterohaemorrhagiae.*

Routine vaccination of dogs is recommended for the prevention of leptospirosis. This should be repeated annually. Well programmed vaccination and re-vaccination helps to reduce the incidence and severity of leptospirosis. it does not prevent subclinical infection or the dispersal of leptospirae via urine. Strict kennel sanitation and rodent control should be practice. Access to wet and low-lying areas etc. should be limited, as should access to wild life to reduce the possibility of infection. Owners should be made aware of the zoonotic potential of contaminated urine. *L. icterohaemorrhagiae* and *L. canicola* bacterin is a component of most polyvalent canine vaccines included with canine distemper, parvovirus and adenovirus used for routine vaccination. We could hypothesize that 3 cases of positive *L. cenicola* serovar which were detected could be the result of a modification of the epidemiological situation of canine leptospirosis or due to post-vaccination responses. Treatment depends on the severity of the disease. Acutely-ill patients should be hospitalized and their activity should be restricted. Warmth and rest are beneficial and their progress should be carefully monitored. Patients suffering from shock and dehydratation should receive fluid therapy. Blood transfusion may be required in cases of severe haemorrhages. Cases of oliguria and anuria initially required rehydratation followed by the administration of diuretics. Peritoneal dialysis may be needed. Antimicrobial treatment is necessary to rid the kidneys of leptospirae.

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