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OCCURRENCE OF LEPTOSPIROSIS IN DOGS IN CENTRAL KERALA

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ABSTRACT

Leptospirosis is a zoonotic infectious disease prevalent in the tropics caused by the pathogenic spirochaetes of the genus *Leptospira*. Dogs act as reservoir host for *Leptospira species* and can transmit the infection to humans especially dog owners. A study was conducted in Thrissur, Ernakulam and Palakkad districts of Kerala to find out the occurrence of leptospirosis among suspected and healthy dogs. The results of the study revealed that 4.82 per cent of the samples were found positive based on Dark Field Microscopy. District- wise occurrence of Leptospirosis by Microscopic Agglutination Test (MAT) was found to be 2.22 per cent, 4.61 per cent and 18.88 per cent in Ernakulam, Palakkad and Thrissur districts respectively. The common serovars identified were Australis (18.89 per cent), Grippotyphosa (17.39 per cent), Icterohaemorrhagiae (14.49 per cent) and Autumnalis (14.49 per cent).

Key words: Leptospirosis, Serovars, Microscopic Agglutination Test, Dark Field Microscopy

INTRODUCTION

Leptospirosis is an important re-emerging infectious disease with a broad host range and is an important public health problem (Haake and Levett, 2015). Leptospirosis is caused by the pathogenic members of the genus *Leptospira* that comprises more than 250 known serovars, grouped into serogroups based on the antigenic similarities. In dogs, it is characterized by fever, vomiting, diarrhoea, myalgia and other signs consistent with hepatic and renal insufficiency. Canine leptospirosis offers a great risk to humans because of the close association between the pet and its owner. Despite routine vaccination of dogs, there is an increasing incidence of leptospirosis in Kerala (Ambily *et al.,* 2013). Leptospirosis is mainly reported during the monsoon

season. The organism enters the body through skin abrasions, breaches of surface integument, mucous membrane and genital tract. Since the vaccine used in dogs are serovar specific, there is a need to identify the prevalent serovars of *Leptospira* in the state for effective control of the disease. Hence a study was conducted to study the occurrence of leptospirosis among dogs in Thrissur, Ernakulam and Palakkad districts of Kerala.

MATERIALS AND METHODS

A total of 290 canine blood samples were collected from dogs presented in different veterinary hospitals in Thrissur (n=180), Ernakulam (n=45) and Palakkad (n=65) districts. The samples for the study included blood samples from apparently healthy unvaccinated dogs (155) and unvaccinated dogs suspected with leptospirosis (135).

The plasma was separated from blood samples collected from dogs and was immediately subjected to dark field microscopic examination (DFM) (Sharma and Kawalath, 2008). Serum was separated and was kept at -20^{0}C until use for Microscopic Agglutination test (MAT).

Antibody titration against *Leptospira* spp. was determined by MAT, following the recommended protocol by OIE (2014). A battery of eight pathogenic serovars *viz., Leptospira interrogans* serovar Australis, Autumnalis, Bataviae, Canicola, Grippotyphosa, Icterohaemorrhagiae, Javanica, Pomona and Pyrogenes obtained from Department of Veterinary Microbiology, College of Veterinary and Animal Sciences, Mannuthy were used as antigens for MAT. End point titers were determined using two-fold dilutions until the last well showing 50 per cent agglutination was recorded. The cutoff for a positive agglutination reaction was defined as a titer ≥100.

Data was subjected to statistical analysis using SPSS version 21.0 software.

RESULTS AND DISCUSSION

The result of the samples found positive by DFM examination is shown in Table-1. Fourteen out of the 290 samples were found positive and the occurrence based on DFM was found to be 4.82 per cent. In the present study, the observed positivity was lower than the reports of Karthikeyan (2004) and Sathiyamoorthy *et al*. (2018) who observed a positivity of 23.52 per cent and 14 per cent in dogs by DFM respectively. The reason for lower number of leptospires in blood samples especially of healthy dogs, may be because, about 10^4 leptospires/mL of blood is required for visualisation of one single organism

in a microscopic field. (Chandrasekaran and Gomathi, 2004). The lower detection levels of the organism by DFM especially in suspected cases may be attributed to the fact that the organisms are seen in blood only during the early leptospiraemic stage after which the organism colonises in the kidney and could not be detected by DFM (Ahmed *et al*., 2005).

The data was subjected to Student t-test and statistically significant difference was observed in the occurrence of canine leptospirosis between Ernakulam and Thrissur districts.

Occurrence of leptospirosis by MAT in dogs is shown in Table 2. The overall occurrence of leptospirosis was 12.75 per cent. District- wise occurrence was found to be 2.22 per cent, 4.61 per cent and 18.88 per cent respectively in Ernakulam, Palakkad

Table -1. Occurrence of *Leptospira spp*. by Dark Field Microscopy

Sl. No.	District	No. of samples	Dark Field Positive Samples		Occurrence (%)
			Suspected dogs (135)*	Healthy dogs (155)*	
1	Ernakulam	45	0	0	0
2	Palakkad	65	2	0	3.07
3	Thrissur	180	12	0	6.66
	Total	290	14 (10.37%)	0	4.82

*Figures in parenthesis indicate total number of samples

Table -2. Occurrence of *Leptospira spp*. by Microscopic Agglutination Test

S. No.	District	No. of samples	No. of MAT Positive Samples		Occurrence (%)
			Suspected dogs (135)*	Healthy dogs (155)*	
1	Ernakulam	45	1	0	2.22
2	Palakkad	65	2	1	4.61
3	Thrissur	180	29	5	18.88
Total		290	31	6	
			(22.96%)	(3.87%)	12.75

*Figures in parenthesis represents total number

and Thrissur districts. Analysis of data using t test revealed statistically significant difference in occurrence of leptospirosis between Thrissur and other two districts. The common serovars identified were Australis (18.89 per cent), Grippotyphosa (17.39 per cent), Icterohaemorrhagiae (14.49 per cent), Autumnalis (14.49 per cent), Bataviae (11.59 per cent), Pomona (10.14 per cent), Hebdomadis (8.6 per cent), Canicola (2.97 per cent), Pyrogenes (1.44 per cent). However, Ambily *et al.* (2013) observed serovar Australis in 23.97 per cent and Autumanlis in 19.17 per cent of suspected dogs in Kerala which is marginally higher than the present study. However, serovar Australis was reported to be the emerging serovar, especially in southern states of India (Balakrishnan, 2008). The predominant serovar observed in dogs of Thrissur district, Kerala by Abhinay *et al*. (2012) was also Australis (36.04 per cent) followed by Pomona (24.42 per cent) but the per cent occurrence was higher than the present study. Variations in the occurrence of different serovars in the same regions have been observed over the years by different research workers. Hence, there is need to study seroprevalence of leptospirosis across Kerala to understand the predominant serovars and their incorporation in the vaccines as the immunity is serovar specific.

SUMMARY

The results of the study reveal that Australis was found to be the predominant Leptospira serovar in dogs of Central Kerala. The zoonotic potential warrants the need for vaccination of dogs and precautions to be taken by dog owners to prevent the transmission of the disease to humans. The prevalent serovars needs to be incorporated in the vaccines to control the disease in the region.

Ethics statement: This study does not involve animal experimentation and was conducted on cases reported in the hospitals, following standard operating protocols of animal handling and sample examination, upon informed consent of owners.

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