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Research Article

Studies on Canine Anaemia due to Leptospirosis

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Abstract

Leptospirosis is a zoonotic re-emerging disease in both dogs and humans and is probably the most widespread zoonotic disease in the world. The most common clinical signs of canine leptospirosis result from damage to the kidneys, liver and lungs, and coagulation abnormalities. Due to introduction of exotic breeds in India, the incidence of severe anaemia has increased resulting in sudden death. Leptospirosis in dogs is an important cause of anaemia. Present study was conducted to evaluate canine anemia due to leptospirosis and to characterize haematological and biochemical abnormalities in canine leptospirosis. A total of 15 dogs infected with canine leptospirosis presented in Small Animal Clinics of GADVASU, Ludhiana, were diagnosed by dot-ELISA kit in a period of one year. The commonly observed clinical signs in affected dogs were lethargy, inappitance, vomition and polyuria. The common hematological abnormalities included non-regenerative anemia, neutrophillic leukocytosis and thrombocytopenia. All the five dogs were azotemic, as concentrations of BUN and creatinine were elevated, suggesting infective renal failure in canine leptospirosis.

Keywords: Anemia; Leptospirosis; Dogs; Renal failure; Dot- EIA

Introduction

Leptospirosis is a zoonotic bacterial disease caused by pathogenic species of the spirochaete bacteria Leptospira [1,2]. It is a re-emerging disease in both dogs and humans and is probably the most widespread zoonotic disease in the world [1,3]. It is essential to have a high index of suspicion for leptospirosis in all dogs with potentially consistent clinical signs so that appropriate precautions can be taken to reduce the risk of zoonotic transmission to veterinary staff and dog owners, and transmission to other dogs. The most common clinical signs of canine leptospirosis result from damage to the kidneys, liver and lungs, and coagulation abnormalities [1,4-6]. Haemolytic anaemia is not a common feature of canine leptospirosis [4]. However, leptospirosis is occasionally mentioned in books and conference proceedings as a possible underlying cause for canine immune-mediated haemolytic anaemia (IMHA) [2,7-10]. Incidence of severe anaemia resulting invariably in death of dogs in a short time of illness is on the increase in Punjab, during last few decades due to introduction of exotic breeds like Grey Hound, German shepherd, Doberman, Labrador and others. Unfortunately these breeds are more susceptible to internal parasitism, viral as well as bacterial infections of locally adopted pathogenicity [11]. In the present study haematological and biochemical alterations in 15 dogs affected with canine leptospirosis were investigated.

Material and Methods

A total of 15 dogs (in a period of one year) infected with canine leptospirosis presented in Small Animal Clinics of GADVASU, Ludhiana, were diagnosed by dot-ELISA kit (Immuno Comb, Biogal, Kibbutz, Galed, Israel). Data of rectal temperature, haematology and serum biochemistry were collected once on the day of admission. Complete history of the animal including age, breed, duration of illness, previous treatment if any, vaccination status and deworming status was taken from the owner. The haematological parameters (Hb, Hct, RBC, TEC, MCV, MCH, MCHC and platelet count) were determined by using automated blood counter (Beckman Coulter, Coulter diff Ac.T, USA). Total leucocyte count was estimated manually by using haemocytometer [12]. The differential leucocyte count was performed manually on blood smear stained by Wright-Giemsa staining method [12]. Reticulocyte count was done by counting reticulocytes on blood smears made from 0.5 ml of whole blood incubated with an equal volume of brilliant cresyl blue. Serum concentration of aspartate amino transferase (AST), alanine amino transferase (ALT), alkaline phosphatase (ALP), blood urea nitrogen (BUN), total protein, albumin, creatinine and total bilirubin were determined by automated clinical chemistry analyzer (Vitros System Chemistry DT 60 11, Orthoclinical Diagnostics, Johnson

and Johnson, USA) using standard kits (Vitros-Ortho-clinical Diagnostics, Mumbai).

Results and Discussion

Fifteen cases of canine leptospirosis were diagnosed during the study by commercially available dot-ELISA kit (Immuno Comb, Biogal, Kibbutz, Galed, Israel). In addition leptospirosis was diagnosed in another animal suffering from IMHA. The commonly observed clinical signs in affected dogs were lethargy, inappitance, vomition and polyuria. Majority of dogs had not been vaccinated against leptospira.

The common hematological abnormalities included non-regenerative anemia, neutrophillic leukocytosis and thrombocytopenia. All the fifteen dogs were azotemic, as concentrations of BUN and creatinine were elevated, suggesting infective renal failure in canine leptospirosis. Renal failure has been reported in 67 per cent of patients infected with leptospirosis by earlier studies [13]. The mean concentration of albumin was decreased while that of ALP was increased as also reported earlier [14] in canine leptospirosis.

Hypoalbuminemia in leptospirosis may occur due to albuminuria attributable to the

glomerulonephritis/renal failure [15]. The mean haematological and biochemical findings in cases of canine leptospirosis are presented in Table 1.

Table 1: Hematological and biochemical findings (Mean±S.E) in canine leptospirosis (n=15).*[21]

Parameters	Units	Patient Data		Reference Range*
		Mean±SE	Observation Range	
Hb	g/dl	6.92±0.90	4.4-9.1	12-18
RBC	$\times 10^6/\mu l$	3.43±0.58	1.92-5.31	5.5-8.8
PCV	percent	17.82±2.50	11.3-25.3	37-55
MCV	Fl	52.94±1.85	47.6-58.6	60-77
MCH	Pg	20.74±1.04	17.2-22.7	19.5-24.5
MCHC	%	39.02±0.87	36-41.1	32-36
WBC	$\times 10^3/\mu l$	28.45±9.72	9.1-56	6-17
Neutrophils	%	89.16±1.81	83-95	60-70
Lymphocytes	%	7.60±1.74	4-13	30-40
Platelets	$\times 10^3/\mu l$	182.2±24.47	77-324	200-500
Reticulocytes	%	0.40±0.13	0-0.8	0.0-1.5
BUN	mg/dl	120.42±25.67	36.0-148.8	7-32
Creatinine	mg/dl	8.24±1.96	1.2-13.2	0.5-1.4
Total protein	g/dl	5.56 ± 0.28	4.9-6.6	5.3-7.6
Albumin	g/dl	2.28±0.35	1.4-2.8	3.2-4.2
Bilirubin	mg/dl	1.16±0.43	0.3-2.8	0.2-1.3
ALP	IU/L	209.8±66.4	131-466	0-90
ALT	IU/L	35.2±11.40	11-73	10-94
AST	IU/L	41.8±5.20	26-57	10-62

Leptospirosis is a zoonotic disease that occurs worldwide in various animal species and is caused by spirochetes that are members of the genus Leptospira. Historically, leptospirosis was recognised as a disease of dogs before it was known in other species, including humans. In recent years acute renal failure, which is due to leptospira serovars other than Canicola and icterohaemorrhagea seems to represent the most important clinical manifestations in both vaccinated and unvaccinated dogs against leptospirosis [16,17]. While anaemia is frequently present in canine leptospirosis (18-68 per cent of cases), it is usually either mild and non-regenerative, or regenerative and caused by blood loss via the gastrointestinal, urinary or respiratory tracts due to thrombocytopenia, coagulopathy or vasculitis [5,18-21]. In the absence of internal or external blood loss in this case, the marked regenerative anaemia was consistent with haemolysis..

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